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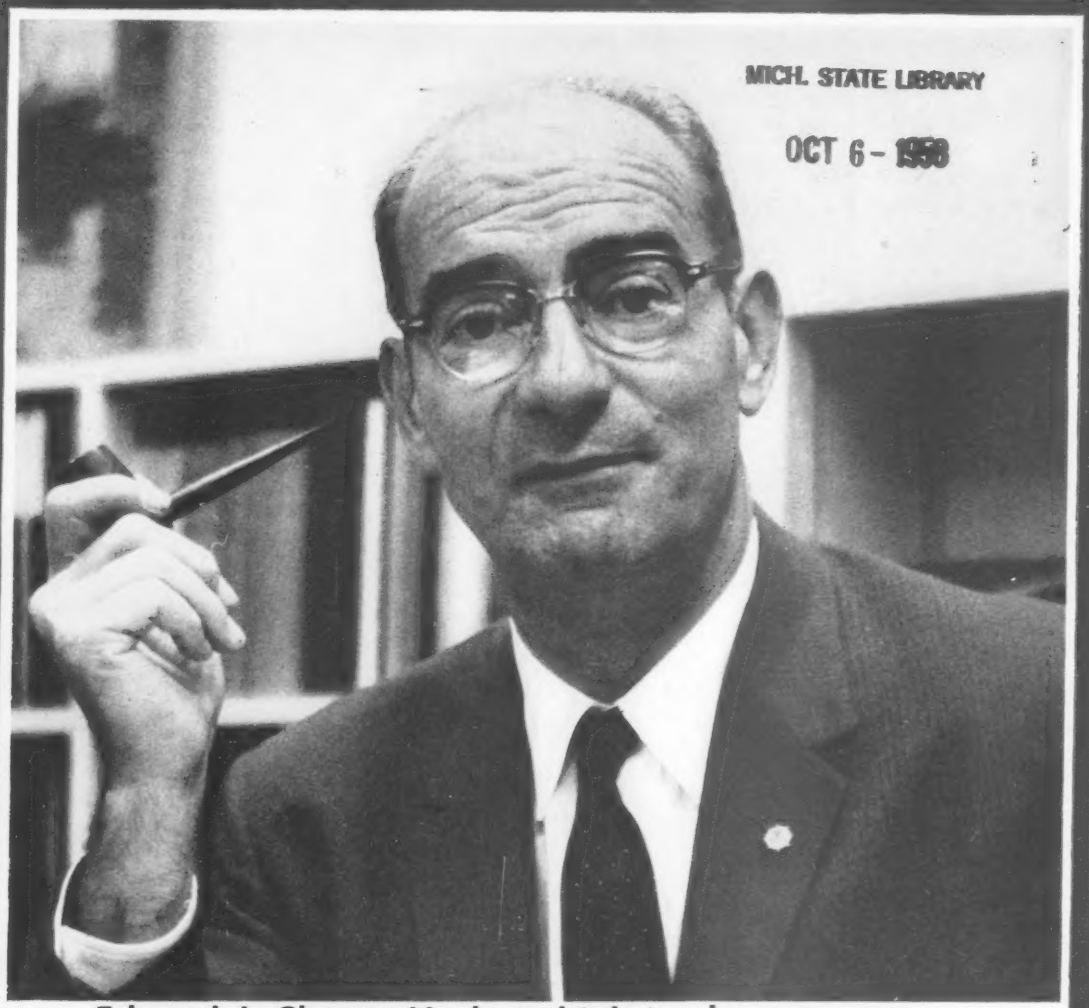

Edward J. Cleary: He bats high in cleanup spot p. 54

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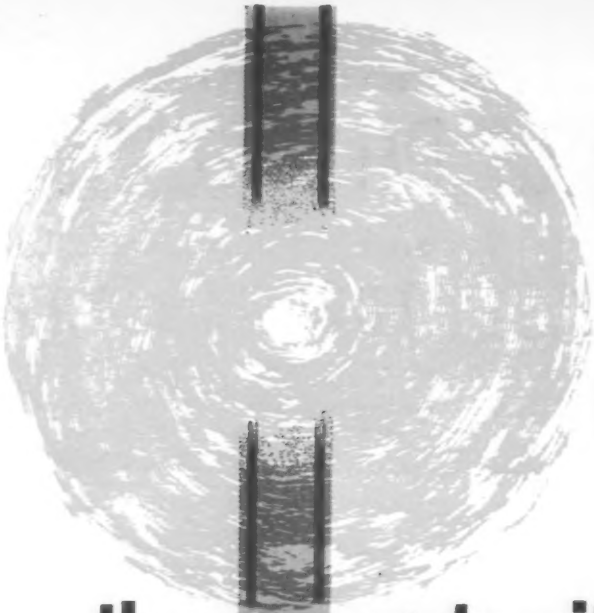

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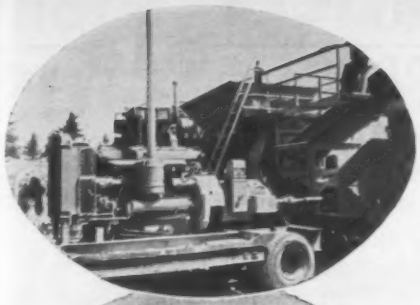

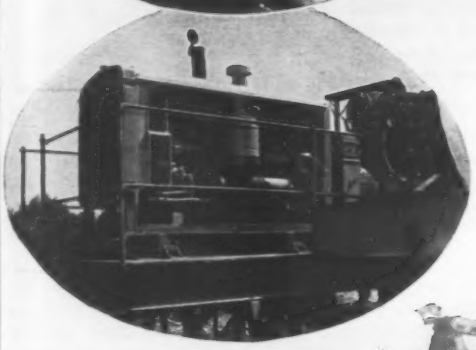

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Murphy Diesel Mech-Elec Unit (upper left) supplies electric and mechanical power simultaneously or separately for a portable aggregate plant in the East.

Murphy Diesel Generator Set (left) provides inexpensive dependable electric power for a portable asphalt plant in New Hampshire.

Murphy Diesel Generator Set (below) reduces powerplant maintenance costs on an all-electric scalping plant in South Dakota. A 121 KW Murphy powers the plant.

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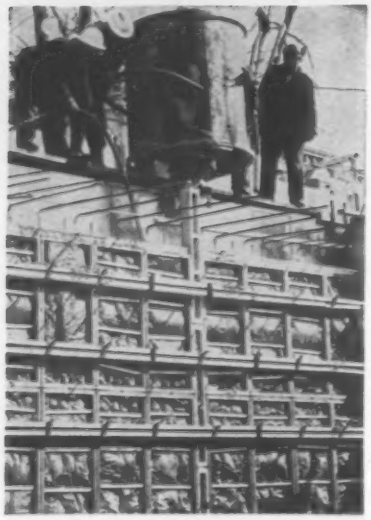

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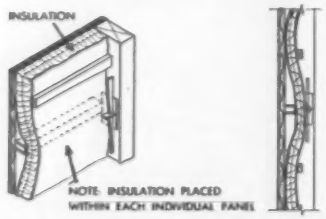
C. R. Meyer & Sons Company, Oshkosh, Wisconsin posted this record 50% savings on the new $1,000,000 central office building of the Wisconsin Telephone Company at Oshkosh. Two-inch insulation in 24-inch widths was tacked to the forms. Walls were 12 inches thick and varied in height from 12 to 16 feet.

Pouring was started in January. Temperatures ranged from five to 25 degrees above zero. Concrete at time of pour was held in the 70 to 80-degree range. During one pour a



Cutaway section of form with insulation

tube was cast in the wall four feet from the top with a thermometer suspended in the bottom. After 24 hours, temperature at center of concrete rose to 105 degrees and after five days the concrete went back to 70.

Symons forms, shores and column clamps may be rented with purchase option. FREE literature on Symons' products is available upon request.

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Independent High Speed Boom Hoists are ruggedly built for hour in and hour out service — power controlled in both directions and operating independently of all other machine functions, Sectional Boom Hoist Rigging and Pendant Lines, Pivoted Gantries, Telescopic Boom Struts, Adjustable Jibs, Removable Counterweight, 3rd Drums and a host of Carrier advantages all combine to permit the maximum in flexibility to get the job done quickly and profitably.

There is a lot to learn about these machines. Ask for a catalog on the size you need.

Above: Heavy steel calls for careful handling and accuracy. The Northwest is a 35 ton Truck Crane.

. . . for more details circle 293 on enclosed return postal card

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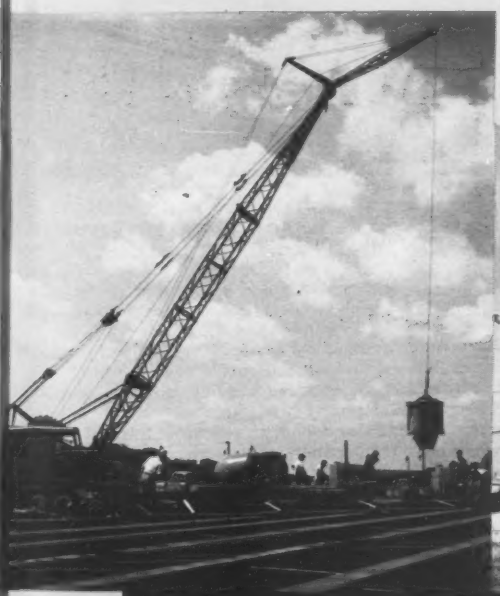

Left: Northwest 25 ton Truck Cranes are speeding up many concrete jobs. They bring you smooth booming, plenty of reach and perfect control of the load.

Above:
Two Northwest 25 ton Truck Cranes coordinate smoothly to set a precast concrete Beam on an overpass job.

Left:
A 35 ton Northwest Truck Crane resets a large concrete tank.

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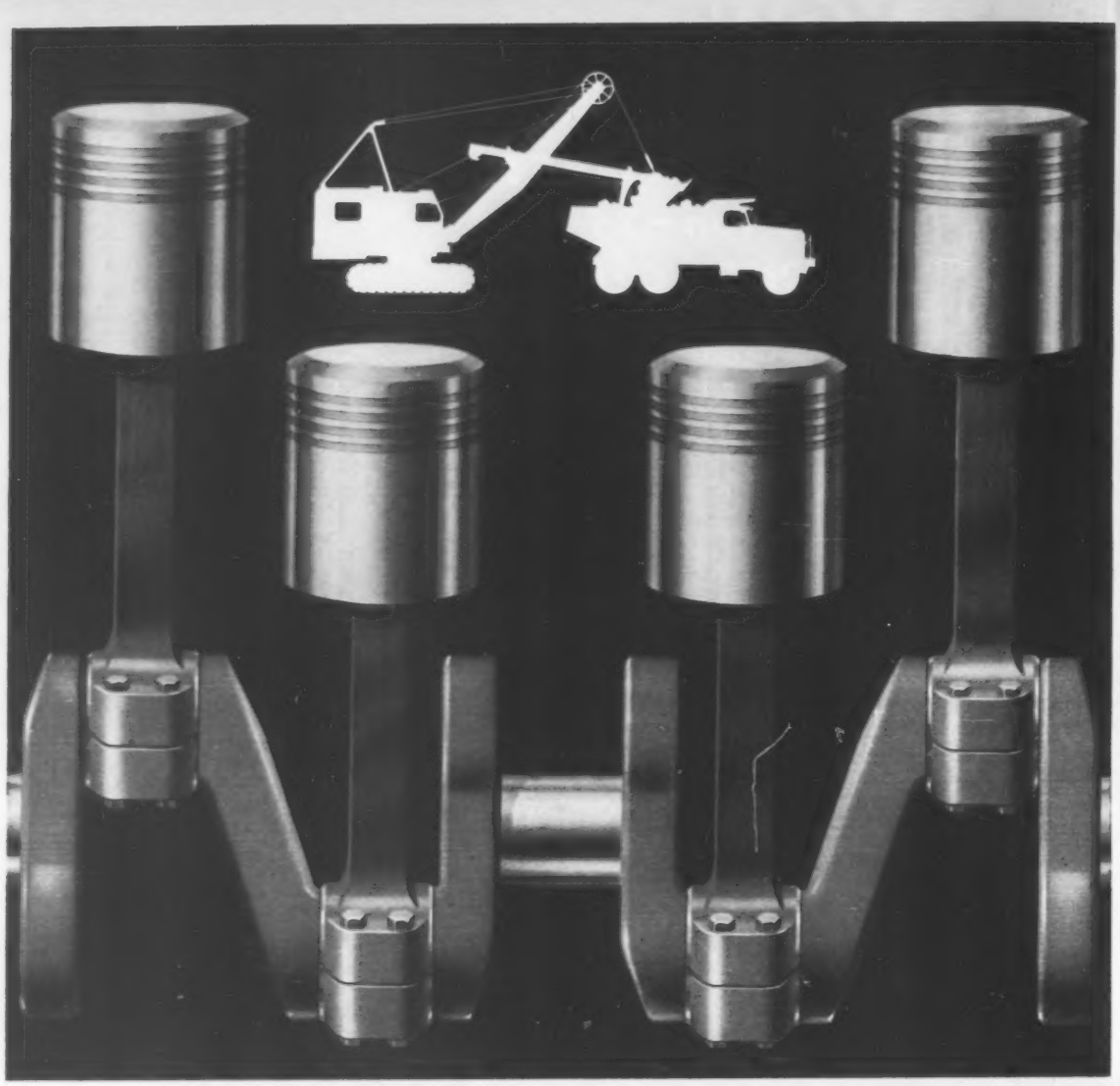

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When tested and compared with a reference heavy-duty oil (of higher than average quality)—in laboratory engine tests and in over one million miles of actual on-the-job field tests . . . engines using Essolube HDX ran *cleaner* . . . showed *less* wear . . . operated *longer* before overhaul. Test engines were torn down and laboratory inspection revealed Essolube HDX gave *better* lubrication in these vital areas:

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For more information on how this outstanding oil can bring savings to your operation, **contact** your nearest Esso office in New England, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, West Virginia, the Carolinas, Tennessee, Arkansas, Louisiana and the District of Columbia. Or **write:** Esso Standard Oil Company, 15 West 51st Street, New York 19, N. Y.

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Barber-Greenes produce 274,000 tons of mix for access road at Glen Canyon Dam

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Two Barber-Greene Finishers easily kept pace with the fast-moving construction schedules. Operating speeds averaged 40 feet per minute, and 7% grades were negotiated regularly, despite 30-ton pay loads in some of the supply trucks.

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58-13-A

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1. Safeguards steel shapes against corrosion during erection

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One of the most recent road building improvements in Texas is the new multi-million dollar bridge and causeway over the intracoastal canal between Galveston and Pelican Island. This structure carries a two-lane highway and a single track railroad. It is comprised of a 10-span bridge, 1135 feet long, with concrete causeway spans.

● **The structure was designed** by Parsons, Brinckerhoff, Hall & MacDonald, of New York. Superstructure contractor is the Kansas City Bridge Company. American Bridge Division, United States Steel Corporation, fabricated and erected all structural steel and flooring.

● **By painting girders** and trusses with Pittsburgh's X-L-O Structural Steel Primer, these shapes were safeguarded against corrosion during shipment and erection. This remarkable finish eliminated need of costly metal cleaning. Uniform coverage was assured even over surface irregularities. Permits rapid drying, regardless of weather, prompt shipments.

● **X-L-O also served** as an excellent foundation for final coats. It is available in combination of red lead and iron oxide, or 100% red lead. Pittsburgh's IRONHIDE and METAL-HIDE, in suitable colors, can be used for such field painting.

● **Pittsburgh's** long experience in supplying protective finishes for structural steel shapes of all kinds can save you time and money. Write, call or wire Pittsburgh Plate Glass Company, Industrial Paint Division, 1 Gateway Center, Pittsburgh, Pa.

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BUT HARTWELL DAM AND TIRES ARE DOING JUST FINE!

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Like steel, tire cord must be *tempered* to be tough.

Goodyear's exclusive 3-T process, involving Tension, Temperature and Time, *triple-tempers* cord to make it TRIPLE-TOUGH—to give you longest tread and tire life, lowest cost-per-job.

With this greatest tire *saver* in 23 years, Goodyear builds off-the-road tires that have the advanced design and *sheer muscle* to overpower the meanest job conditions. If you haven't used Goodyears lately, your jobs could be costing more than need be.

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MOBILE TIRE CARE PROGRAM helps keep the job rolling at lowest final cost.

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Reader Comment

Wright Hotel is Pleasing, But . . .

SIR—Your report on the Imperial Hotel, Tokyo, addition (ENR Aug. 14, p. 25) repeats the widely believed myth that this building gave extraordinarily good performance in the great Kwanto earthquake of September 1, 1923—"while most surrounding buildings fell to rubble."

Perhaps it is our fondness for being told how darned good we Americans really are that accounts for our acceptance of this pleasing tale about an American designed building but as your own illustration attests, Mr. Wright's Imperial Hotel did not venture far off the ground. Perhaps 30 ft high, three storied, and heavily walled, it spread widely over its grounds with numerous beautiful interior courts, pools and gardens. 'Twas all very pleasing in that respect but as a hotel to efficiently serve its patrons and make money for its owners it was quite impractical. And as a marvelous feat of earthquake resistant design it simply was not.

It demonstrated the fact that you'll largely escape earthquake damage by keeping your vertical cantilevers to extremely limited heights. If you want to show outstanding earthquake resistance get up in the air and off the ground. The sole unit of the hotel where this was attempted, the 7 story tower at the rear of the group, settled bodily 7 or 8 in. and, of course, tore loose from its connections with other units.

The settlement likewise badly damaged that other myth about the marvelous foundations Mr. Wright had provided. Quite prior to the earthquake something distressing had befallen this myth in the central unit of the group housing the main dining room of the hotel. Beneath the dining room was located a swimming pool, how framed and supported the writer never learned. Suffice it to say that when the pool was filled the weight of its water content overtaxed the foundations and somehow caused the sidewalls of the unit to settle badly, yet at the same time corresponding settlement of the central portion was prevented. What can be testified to is the amazing heavily crowned appearance of that dining room floor! 'Twas unique, unquestionably.

The writer spent two months in the hotel following the great earthquake and while there is no question that it came through in generally good condition—both long bedroom wings did crack completely through at about the third points—the fact remains that it was so low and sprawling that it could not very well avoid coming through in good condition.

Actually, American engineering gave a very poor performance in this earthquake largely because of American inexperience with earthquakes, prevailing skeleton construction with reinforced concrete, and the unfortunate "strong yet flexible" theory of design that prevailed in the field of structural steel.

The outstandingly good building in Tokyo after the 1923 earthquake was Dr. Taichu Naito's Industrial Bank of Japan, a 10 story height limit steel-framed, concrete-walled building that came through without a crack in it, whereas only a block away two large steel-framed American-built buildings exhibited a mass of shattered brick and terra cotta on their exteriors and shattered partitions within them.

To return to the Imperial Hotel, one must agree with Mr. Wright that there is an essential incongruity between the old buildings and the new addition. Yet where is the incongruity—in the old or in the new—this being a hotel?

HOMER M. HADLEY
Consulting Engineer
Seattle, Wash.

Another View

SIR—You printed a brief article entitled "Utility Workers Protest Construction by Contract," pertaining to recent contracts let by the Board of Water and Power Commissioners of the City of Los Angeles (ENR July 10, p. 120). The implication of your title, and certain information omitted from your article, combine to give an erroneous impression that I would like to correct.

The total cost of the project, if done by contract, will be more, not less, than if done by the Department's own crews, in the amount of from $5-$10 thousand, depending upon the amount of pay increases that might be given to

Engineering News-Record welcomes expression of opinions from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

Amusement park operators* know that their rides must be exciting to be successful. But with the lives of riders and onlookers at stake, operators rely on *quality* wire rope to ensure . . .

a safe ride

Safety comes first, wherever wire rope is used. You may save a few pennies on the purchase of a "bargain" rope. But it will cost you *more* than you bargained for, if it results in injured personnel and wrecked equipment. Make sure you get *quality* wire rope—buy Wickwire Rope.

**Picture shows the Rocket Ride at Palisades Amusement Park, Fort Lee, N. J. Wickwire Rope provides the only support for each of these planes.*

CF&I WICKWIRE ROPE A CF&I PRODUCT

LOOK FOR THE YELLOW TRIANGLE

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

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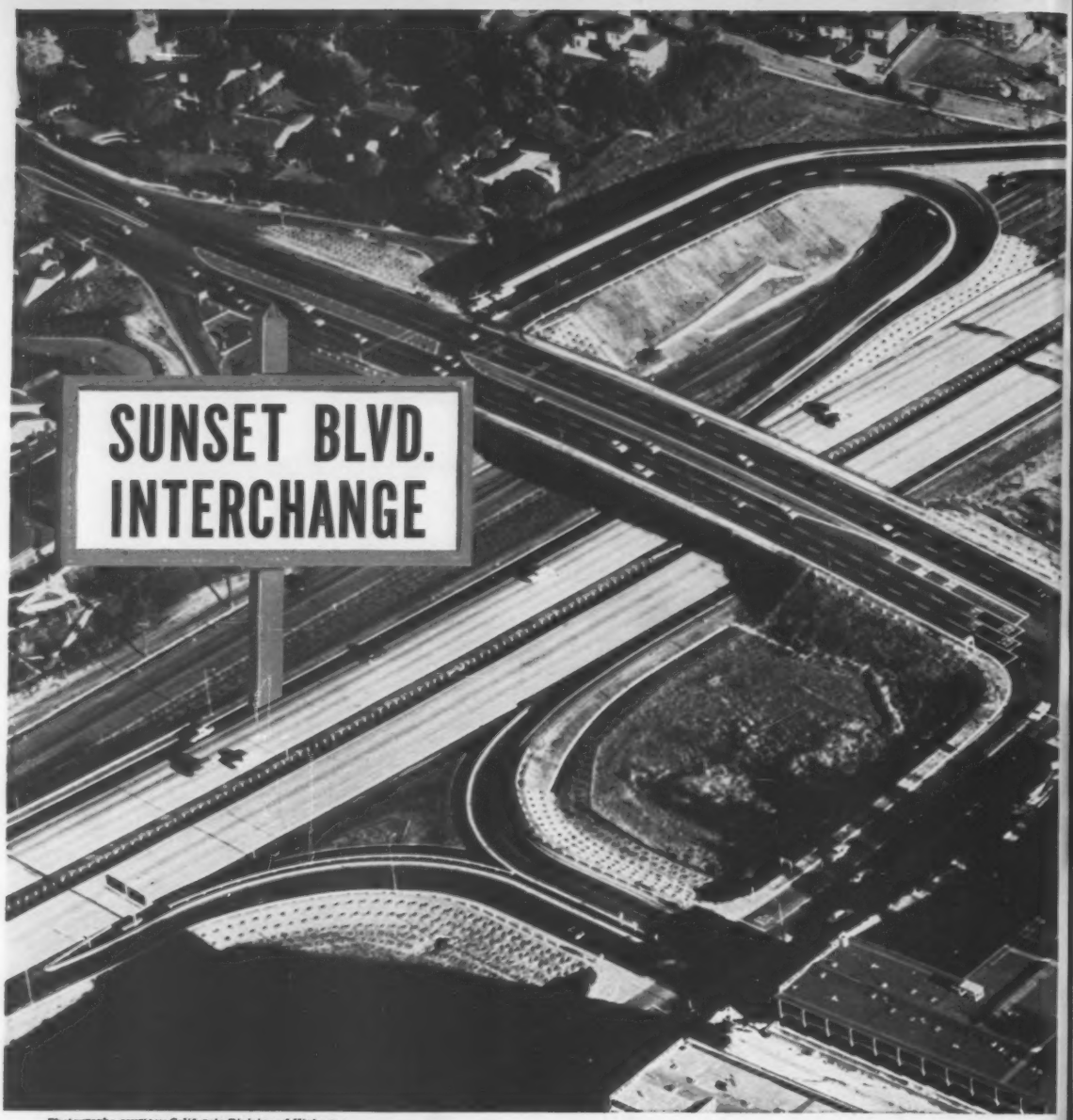

Photographs courtesy California Division of Highways

STAY ON SCHEDULE WITH *Reinforced Concrete*

Although the national roadbuilding program is in high gear, there are still many rivers to bridge . . . many freeway interchanges to build. Reinforced concrete is playing a major role in this vast construction undertaking. Reports from many important projects, such as the Sunset Boulevard Interchange on the San Diego Freeway in Los Angeles, indicate that more and more highway engineers find they can count on their bridge and separation structures being "completed on time" when they design for reinforced concrete.

Concrete Reinforcing Steel Institute

38 South Dearborn Street Chicago 3, Illinois

Stretch Dollars – Save Manpower with equipment that does more . . .

WORK BULL 1001

CONVERTS INTO EIGHT DIFFERENT MACHINES AND OUT-PRODUCES EXPENSIVE SINGLE-PURPOSE EQUIPMENT

Davis 210 Backhoe on Work Bull 1001 has its own backfill blade; same machine handles digging and backfilling.

The Work Bull 1001 as a rotary broom has 96" swath, 30° left and right hydraulic angle control.

Work Bull 202 and Davis Loader-Backhoe have been integrated for maximum efficiency.

UNEQUALLED VERSATILITY The Work Bull 1001 obsoletes single-purpose machines that sit idle most of the time. This top-quality, 60.3 h. p. rig converts from a ⅞ cubic yard Loader to a Pick-up Sweeper . . . to a Backhoe (with its own backfill blade) . . . Fork Lift . . . Crane . . . Angle Dozer . . . Rotary Broom . . . and back to a Loader and Scarifier right in the field. Each performs so efficiently you will think it is intended for just that one purpose.

INSTANT REVERSING WITHOUT SHIFTING To change direction of travel on the Work Bull 1001 you simply switch your foot from the forward acceleration pedal to the reverse acceleration pedal. No gears or levers to move. This, plus power steering, torque converter, five-speed transmission in either direction, and left and right brakes lets you work circles around other machines.

43° ROLLBACK AT GROUND – DIRECT LINE THRUST You actually get "bull-dozer" action when digging plus more breakaway. Special shock load absorbers reduce spillage and cushion load in rough terrain. Also has "float" position so attachment can ride over the surface on which it is working.

LOW PACKAGE PRICE It costs so little to own a Work Bull 1001. Select the basic unit and whatever attachments you need. It will cost you less than what you normally pay for a single-purpose machine.

OTHER POWER MATCHED MASSEY-FERGUSON EQUIPMENT include the Work Bull 202 (40 h. p.) Tractor, Work Bull 303 (54.5 h. p.) Tractor, Work Bull Fork Lift, Davis Loader and Backhoe, plus a multitude of integrated attachments for each basic unit.

For information on the complete Massey-Ferguson line ask for Brochure G-4. For specific information on the Work Bull 1001 ask for Brochure W-1. *Write Massey-Ferguson Industrial Division, 1009 South West Street, Wichita 13N, Kansas.*

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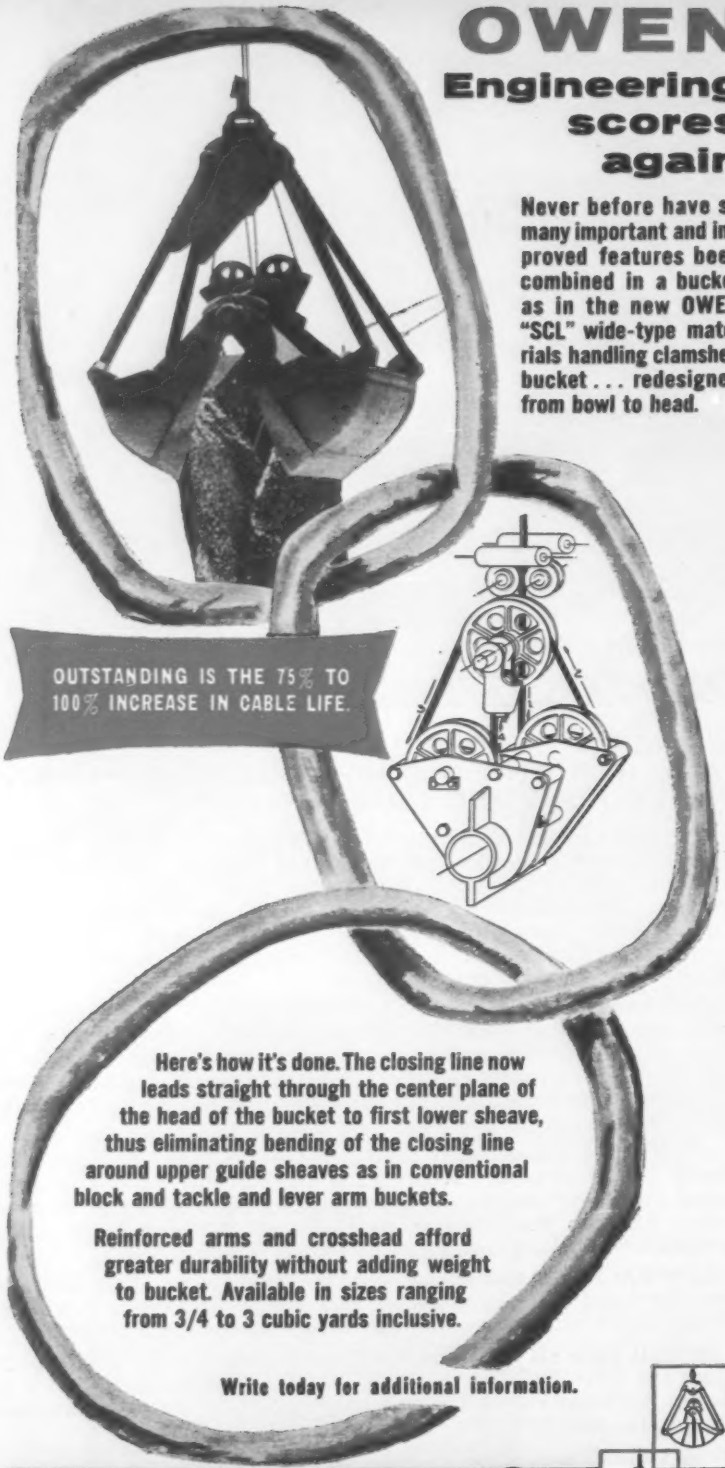

OUTSTANDING IS THE 75% TO 100% INCREASE IN CABLE LIFE.

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Reinforced arms and crosshead afford greater durability without adding weight to bucket. Available in sizes ranging from 3/4 to 3 cubic yards inclusive.

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department employees to meet prevailing wages in private industry. For this reason, the engineers and management of the Department recommended to the Board of Water and Power Commissioners that the work be done by Department crews, which had just completed work identical to that called for in the contracts.

The five man Board of Commissioners, two of whose members are prominent contractors, disregarded the recommendation of the engineers and management in awarding the work to private contractors, at a higher total cost to the Department. The fact that many workers would be laid off, and that expensive equipment already available would be idle or be disposed of at a loss was not the basic factor in management's recommendation.

The employees of the Department of Water and Power do not object to construction by contract, which is the method used for many years on the Department's major construction projects. They do object, however, to action by the Board of Water and Power Commisioners undermine management, impair employee morale, cost the water and power users of Los Angeles more money, and threaten the successful operation of the nation's largest municipally-owned, water and power utility, all apparently for the benefit of a few friends of certain Commissioners.

GEORGE E. BROWN, JR.
Chapter Representative
Civic Center Chapter, EAA
Los Angeles, Calif.

Wrong on Right-of-Way

SIR—E. O. Parsons has been named utilities engineer for the Montana Highway Department, as noted in Men and Jobs (ENR Aug. 7, p. 70).

However, Paul F. Reynolds is not under the direction of E. O. Parsons in his new position. Paul F. Reynolds has assumed the position of right-of-way administrator, assisted by Thomas Johns as senior right-of-way administrator, and Ivan Shaw as assistant right-of-way administrator.

FRED QUINNELL, JR.
State Highway Engineer
Helena, Montana

CALENDAR

Federation of Sewage and Industrial Wastes Associations, annual meeting, Sheraton-Cadillac Hotel, Detroit, Mich., October 6-9.

National Society of Professional Engineers, fall meeting, St. Francis Hotel, San Francisco, Calif., Oct. 23-25.

American Concrete Institute, regional meeting and headquarters dedication, Statler Hilton Hotel, Detroit, Oct. 27-28.

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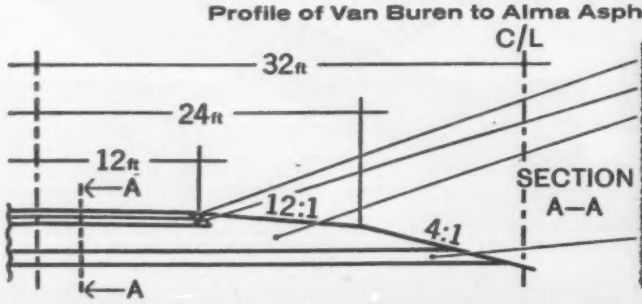
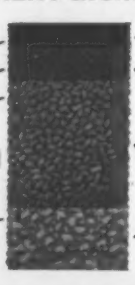
Profile of Van Buren to Alma Asphalt Pavement Design





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. . . only 12 man-days maintenance in first five years of service

During their first five years of traffic, the rugged Asphalt-paved lanes of U. S. Route 64 (dualized in 1953) between Van Buren and Alma, Arkansas have required *only* 12 man-days of maintenance.

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What's more, suitable aggregates often can be found on or near the right-of-way. Ordinarily you can expect bids for a modern, Asphaltic concrete road to run from 10% to 50% LESS than for rigid construction.*

By using heavy-duty Asphaltic concrete any state can pave . . . *and maintain* . . . more and better roads with its tax dollars. This is the fundamental on which designers of many of today's outstanding roads have built their reputations . . . roads like the New Jersey, Will Rogers, Kansas and New Hampshire Turnpikes . . . and many others.

**Saves from $11,768 to $92,628 per mile. Write for details.*

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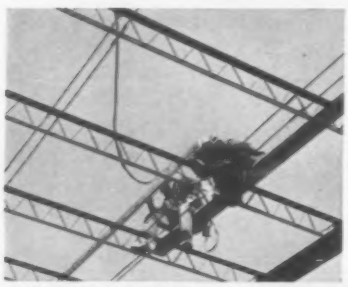
See your Ryerson Steels catalog for the complete list of products—and write for our Bulletin No. 70-2 on specialized reinforcing service for contractors.

RE-BARS—New-billet, deformed reinforcing bars in stock at 15 Ryerson plants. Designed for highest bonding power, bars conform to all building codes and to ASTM specs. A-15-52T and A-305-50T.

WIRE FABRIC—Electric-welded fabric of cold drawn wire in rolls available from stock in a wide range of standard gauges and spacings. Special gauges and spacings furnished to order.

SPIRALS, for column reinforcement—Made from hot rolled wire rod or cold drawn wire in ¼", ⅜", ½" and ⅝" diameters complete with channel spacers. Collapsible for shipment.



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ENGINEERING NEWS-RECORD

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THE CONSTRUCTION WEEK

TWO-YEAR TRUCK RIDES—They'll soon be off and running at Ottawa—and keeping at it 18 hours a day, six days a week for two years. The track is the American Association of Highway Officials' test road in Illinois (ENR June 19, p. 52). Its 700 separate pavement sections open in mid-October. Selected U.S. Army drivers—300 of them—will jockey a variety of trucks over the $22 million research project.

FAST CONCRETING—A 2,740 cu yd pour of truck-mixed concrete was made in 10 hours last week in New York City. The concrete formed a 5 ft thick foundation mat for one of six 21 story apartment buildings. Forty-five trucks delivered the concrete. Two crawler cranes placed it in the center, while 23 men handled concrete from chutes spaced around the edges. The contractor is a joint venture of George F. Driscoll Co. and Moccia Construction Corp., both of New York City.

CROSS CHANNEL POWER?—Tests have started on methods of laying a submarine power cable across the English Channel. They're a preliminary to construction of a $12.6 million cross-channel direct-current line, 30 miles long, to allow Britain and France to exchange electric power. Completion is expected in 1960. Trials will check techniques of laying two cables simultaneously 10 ft apart at 114 ft depth.

JUST LIKE HOME—Contractors would have felt right at home with the machinery exhibited at the American Mining Congress Equipment Show in San Francisco last week. Center of attraction were the huge, high-powered, ore-moving rigs—identical to units used in construction operations. Fact is, tools and techniques of exploiting ore are becoming more and more like those used in heavy construction. Major mining firms are now retaining construction organizations for special jobs and some contractors are even going into mining for themselves.

ULCERS FOR AD MEN—The men in the gray flannel suits don't like billboard regulations for the interstate system one bit. Over 100 spokesmen, unhappy with the Bureau of Public Roads' restrictions on road signs, had commented when comments were shut off this week. Ad men don't like sign size restriction or the idea of all signs being bunched together in "information" areas. The Department of Commerce will issue final regulations soon.

FOR ACCURATE SPECS—In a move aimed at deflating initial bid prices, the Canadian Construction Association has asked public agencies to guarantee sub-surface data included in specifications. With greater confidence in the specifications, the association reasons, contractors would not have to add a safety margin to their bids (see p. 83).

DURABLE

Penn-Dixie "One Package" Mortar Cement meets A. S. T. M. specifications. That means real durability for your jobs.

Easily mixed with the recommended amounts of sand and water, Penn-Dixie mortar offers more than durability on any job. Its smooth consistency makes it easy to work . . . it gives you high yield without sacrificing strength and is water repellent.

Use or specify Penn-Dixie "One Package" Mortar on your next job. You'll be glad you did!

Penn-Dixie means Permanent Dependability

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WASHINGTON OBSERVER

- **Budget controls tightened**
- **New investment plan looks promising**
- **Tallamy will stay on the job**
- **Contracts for Titan bases coming**

● **Tighter budget rein over Administration spending programs is becoming more apparent.** The budget for fiscal 1960 is being trimmed wherever possible—with "national security" the guiding factor on whether a program is okayed, cut, or eliminated.

President Eisenhower is strengthening the hand of the Treasury Department and the Bureau of the Budget in the reshuffle of the White House staff. The result will be more authority over spending vs. deficits for the President's close advisers.

Robert E. Morrison, former deputy director of the Budget Bureau, is going into the White House to ride herd on inter-departmental affairs—programs of the Departments of Interior, Commerce and so on.

Fred C. Scribner, Undersecretary of the Treasury, also is slated to go into the White House—as a deputy assistant to the President. Budgeting will be his bailiwick.

—

● **The new federal plan for spurring small business investments holds bright promise for building and housing contractors.** One idea: It may be an opportunity for small contractors to go into suburban development in a big way (see page 84).

For example, smaller contractors could get together to form a small business investment company. With their combined resources and bank loans, they could undertake major development projects. Although banks were barred under 1933 and 1935 banking laws from investing in unimproved real estate, they can, under the new program, set up small business investment companies to provide funds for small business contractors for that purpose.

Banks and other financial institutions are showing tremendous interest in the program.

—

● **Discount reports that Bertram D. Tallamy is quitting as Federal Highway Administrator.** Talk was current again this week. But Mr. Tallamy intends to stay on the job for a long time. He regards the 13 year federal highway program as his permanent assignment. Mr. Tallamy is recovering now from a second cataract operation. He intends to be back at work in two weeks.

One Tallamy critic has resigned from the Commerce Department, which controls the highway program. Louis S. Rothschild, Undersecretary for Transportation, resigned last week. He and Mr. Tallamy were at odds over the 1958 amendments to the Federal Highway Act; but their differences were never serious enough to force one or the other to go.

—

● **Contracts for construction of bases to lanuch the Titan intercontinental missile may be let soon.** The Titan, which is more advanced than the Atlas, is now under development. Installations will be "hard" bases; that is, underground with protecting canopy construction. All the Atlas bases, in Wyoming, California, and Washington, are "soft," above ground slabs with exposed supporting installations.

Gateway TO THE STARS

Dramatic Concrete Ramp at New York International Airport Provides Graceful Access to Arrival Building

• "Gateway to the Stars"—at Idlewild Airport—is a curving reinforced concrete promenade which connects with a prestressed concrete bridge leading to the Arrival Building.

Imaginative and daring in design, this strikingly modern ramp, set on widely spaced concrete columns, skirts the edge of the broad circular reflection pool in a graceful sweep.

The bridge which leads through the 11-story control tower, is fabricated of prestressed concrete channel beams made with 'Incor'*, America's FIRST high early strength portland cement, and also utilizes widely spaced columns.

Well-integrated designs, coupled with concreting know-how, make this a quality job of highest order. Artistry in concrete has been achieved, plus an all-important economy that lasts for the life of the structure, making the most of today's construction dollars.

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SKIDMORE, OWINGS & MERRILL (Building and Bridge)
Associate: **WALLACE K. HARRISON**
HERBERT FLEISCHER (Pool and Ramp)
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Contractor: **TULLY & DI NAPOLI, INC.** (Bridge, Ramp, Pool)
Flushing, New York

Prestressed Bridge Beams
PRECRETE, INC. Flushing, New York
Soil Cement: **FRANK MAMORALE, INC.**
Glen Cove, New York

Masonry:
TEACO CONSTRUCTION CORPORATION (Pool, Ramp)
Bronx, New York

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Both of New York City, N. Y.

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"Contractors are committing economic suicide by bidding so low."

"A man who figures on making a profit just can't get a job."

"There's no telling where it is going to end but something's got to give."

"There are just too damn many contractors."

"When 18 bidders go after a $700,000 job how high can the price be?"

"In the building field the "Brokers" are killing us — they bid the job without a profit, then make their money on the subs."

Contractors are groaning more than usual about tough competition . . .

"It's a Profitless Prosperity"

Competition among contractors today is rougher than it has been at any time since the 1930's.

That was the prevailing opinion among the 500 persons attending the midyear business meeting of the Associated General Contractors last week in Atlanta.

The result is a "profitless prosperity," they say. And many contractors believe this situation has suicidal implications for large segments of the construction industry.

If these contractors are right, there's a paradox that's hard to understand. Construction contract awards are near the highest point in history. The highway program is well under way. Other public works and some private categories of construction are topping previous figures. On the surface, these facts would seem to assure contractor prosperity.

But this is far from the case, say the contractors.

Traditionally, no contractor will admit to anyone but his banker or his bonding company that he is making money. But the general atmosphere of pessimism so prevalent at the meeting was not that of men trying to dodge the tax collector; it was that of men who are enmeshed in conditions they don't quite understand and can't quite cope with. Although they admit the conditions are their own doing.

Compliants about the excessive competition and the dangerously low or even nonexistent profits came from all types of contractors—heavy, highway and building, large and small, from every section of the country. Every contractor had an explanation for the condition, and many were willing to predict its outcome. But no one would lay claim to a workable solution for the immediate future.

The most commonly advanced reason for the trouble was expressed by a Virginia roadbuilder who said, "There are just too damned many contractors." And case after case was cited as proof. There were numerous reports of 10 to 14 contractors fighting over jobs ranging in size from $60,000 to over $6 million.

An extreme example involved a $700,000 Arizona highway job let last month on which there were 18 bidders. All of them submitted prices under the engineer's estimate. The low man, whose price was 17% below the engineer's estimate, admitted that he would be lucky to break even on the project. "But I needed the job to keep my organization together," he said, "and I had 17 other hungry contractors bidding against me. When 18 contractors go after one $700,000 job, how high can the price be?"

Rough competition is not limited to the small or medium sized contractors. Top men in several organizations accustomed to handling, alone or in joint ventures, projects in the $10 million to $100 million range admitted being hurt by low bidding competitors. One giant in heavy construction offered this explanation. "World War II made it possible for many companies to expand. Now they can't find jobs in their usual price range, so they're forming combines and going after big ones. And they're giving us plenty of trouble."

There is more to the problem of excessively low bids than just too many contractors. This was evidenced by numerous complaints of "unreasonable" competition, even when there were just a few bidders involved.

Many of the examples cited bear out the results of a recent ENR survey in several states showing the relationship between the number of bidders on highway jobs and the size of the bid prices submitted (ENR Aug. 28, p. 24). In New York State, the average number of bidders per job dropped from seven during the first quarter of 1958 to 4.8 in August. Yet the state's highway bid price index also declined. For August, in spite of fewer bidders per job, the average of low bids was 20% lower than the engineers' estimates—the greatest spread in three years. Similar conditions were found in both California and Nevada. And from the comments of men at the Atlanta meeting, it ap-

. . . A Phoenix builder says: ". . . I've got to get jobs. So while I'm cussing out the other fellow for bidding too low, I'm trying to underbid him"

pears that the condition is widespread.

Why should prices be low when there are just a few bidders? There are many answers. Several contractors put reverse English on the ball and suggest that the reduction in the number of bidders was caused by low prices. They believe firms balked at spending time and money estimating jobs they felt they could not get.

On the other hand, some contractors have increased their bidding activity in an effort to maintain productivity. A western builder claims he is holding a $10 million gross because he doubled his estimating activity. Whereas two years ago he figured on getting one job out of 20 bids, now he is forced to bid on 35 to 40 jobs to get one. This enables him to hold his annual gross contract volume. However, he admits that if all his competitors did the same thing, there would be no net gain for anyone.

A building contractor working in New Mexico and Colorado blames "brokers" for low prices in the building construction field. "They figure on subbing the whole job, use the sub prices without adding any profit for themselves. Then they bid shop for weeks and get their profit on what they can chisel from these subs," he charges. "They let the subs do all the work, take all the risk, and supply the financing. Then if the brokers aren't satisfied with their profit, they increase it by beating the subs out of part of their final payments. A legitimate contractor can't compete against that."

The brokers' explanation, of course, is that they're trying to get the best possible price for the owner.

Most contractors, however, admit that the blame for their troubles rests with themselves. "A man has to have a competitive nature to become a contractor," says one, "and the competitive spirit is just going too far."

The youthful, third-generation head of a 70-year-old Wilmington, Del., building firm agrees. "Builders are not bidding a job for what it's worth or what it's going to cost. They are setting their prices at just under what they think their competitors will bid." Then, he adds, "They are trying to see how cheaply they can do a job—not how much money they can make."

No one at the meeting offered an immediate solution to the problem. The self-generating nature of the competition was evidenced by a Phoenix builder who said, "I yell louder than anyone I know about low bid prices, but to stay in business until things get better, I've got to get jobs. So while I'm cussing out the other fellow for bidding too low, I'm trying to underbid him."

All opinions on the effects of the current bidding practices were almost the same. "It's a question of the survival of the fittest—and a lot of contractors are going to be hurt before this gets any better."

The solution, says a Californian, is for contractors to "get smart and realize that if they all raise their bid prices to a decent level, there will still be a successful bidder on every job."

AGC Pulls Surprise in Nomination of Officers

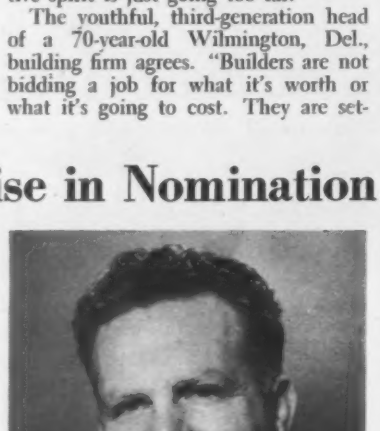
The surprise nomination of Massachusetts builder John A. Volpe, sole candidate for the 1959 vice presidency of the Associated General Contractors of America, provided contrast to the routine naming of James W. Cawdrey as candidate for president at the mid-year business meeting of AGC last week in Atlanta. Since both men are unopposed, the nomination is tantamount to election. This means that Mr. Volpe will head the big contractors association in 1960. Progression is virtually automatic.

Mr. Volpe's nomination broke a precedent of long standing that calls for the systematic rotation of AGC's top offices among its three contractor groups —highway, heavy construction and building contractors.

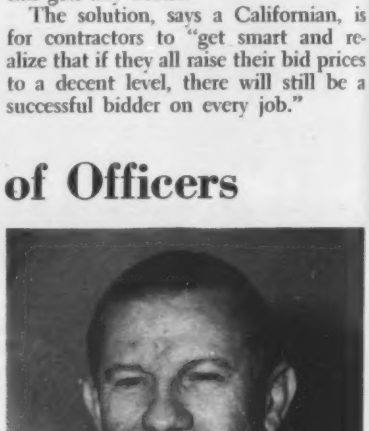
Under this unwritten—but previously observed—rule the nomination was expected to fall to a man in the heavy construction field. Although it can be argued that Mr. Volpe's recent ventures in missile base construction makes him a heavy construction man, he always has been regarded as a building contractor and is so classified by the AGC.

Two men in the heavy construction group were suggested for the post, but both withdrew their names in favor of Mr. Volpe.

Mr. Cawdrey has been a building contractor since 1934. Since 1950 he has been president of the Seattle firm of Cawdrey & Vemo. He is an engineering graduate of the University of Washington and he was president in 1950 of the Seattle Chapter of AGC and has since served in numerous key posts with the national group.



James W. Cawdrey



John A. Volpe

Mr. Volpe heads a Massachusetts firm that bears his name. He gained nation-wide attention in 1956 when he was named the country's first Federal Highway Administrator. He served on an interim basis until Bertram D. Tallamy was able to finish up his commitments as head of the New York State Thruway Authority.

While almost exclusively a building contractor, Mr. Volpe's stint as Highway Administrator was not his first experience with road work. In 1953 he took a leave from his business to become Commissioner of Public Works for the State of Massachusetts under Gov. Christian A. Herter. In this job he was responsible for one of the biggest highway construction programs in the state's history. He was also one of five engineers on a committee that advised Congress in preparation of the Federal Aid Highway Act of 1956.

Mr. Volpe was also among the prominent construction industry representatives called in to advise Congress when it was preparing the Federal Highway Act of 1956.

Bad News for West

Iraq development sparks interest of Communists

The new Iraqi government is welcoming technical fact-finding missions from the Communist countries of Eastern Europe. They are flocking to Baghdad to look into the possibility of participating in Iraq's development schemes. The government also has decided that there will be no foreign members on its new Development Board; the old board contained a U.S. and a British member. These two moves are definitely in the direction of reducing Western influence (ENR July 24, p. 23).

Before the revolution in July, the doors of the Iraq Development Board were tightly closed to the countries of the Soviet bloc, with whom Iraq didn't even have diplomatic relations. Since the revolution, Iraq has resumed diplomatic and trade relations with the Communist countries and has invited technical missions from several of them to see for themselves the possibilities of closer economic and technical cooperation.

The Soviet bloc countries have been encouraged by pledges from the new Iraqi leaders that in signing new development contracts they will treat Eastern and Western countries on an equal footing, and solely according to the interests of Iraq.

In the meantime, since the dismissal of all the former executive members of the Board and their replacement with a ministerial committee, a four-man technical committee has been formed to advise the new administration.

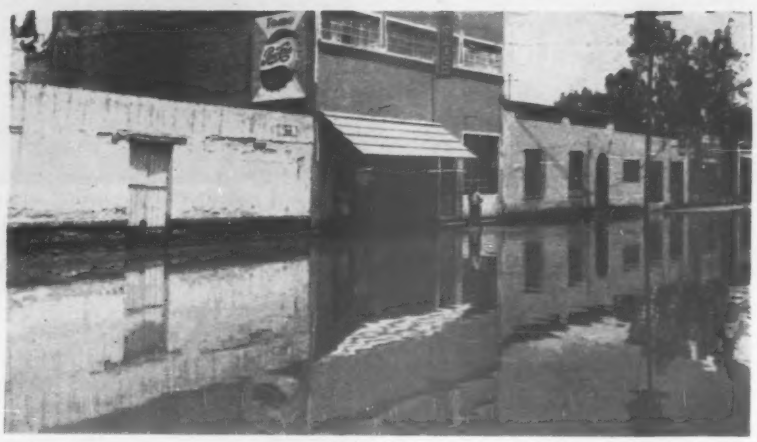
International Engineers Will Meet With ASCE

The International Association for Bridge and Structural Engineering will hold a joint meeting with the American Society of Civil Engineers during the ASCE convention in New York City October 13-17. Papers will be presented by engineers from Europe and the U.S. on a wide variety of subjects—ultimate-strength design of steel and concrete, research on concrete dams and shells, dynamics, fatigue of metals, stability, and prestressed concrete.

The IABSE, which has its headquarters in Zurich, Switzerland, has 2,500 members, including 250 from the U.S.

It holds congresses every three to five years and publishes the papers presented. U.S. members formed an association in 1939. Information on IABSE can be obtained from Prof. C. M. Antoni of Syracuse University, Syracuse 10, N. Y., who is secretary-treasurer of the U. S. Council, IABSE.

Despite Sandbagging of Sewer Walls . . .



. . . Sewage Inundates Mexico City Streets

Floods in Mexico have left 40,000 persons homeless, dozens drowned and a cleanup job of staggering proportions.

In the capital, sewage inundated several blocks of a poor residential neighborhood when high water rendered a pumping station ineffective, reversed sewage flow through the area's gravity mains and breached the walls of a huge open sewer called the "Gran Canal," Mexico City's principal interceptor.

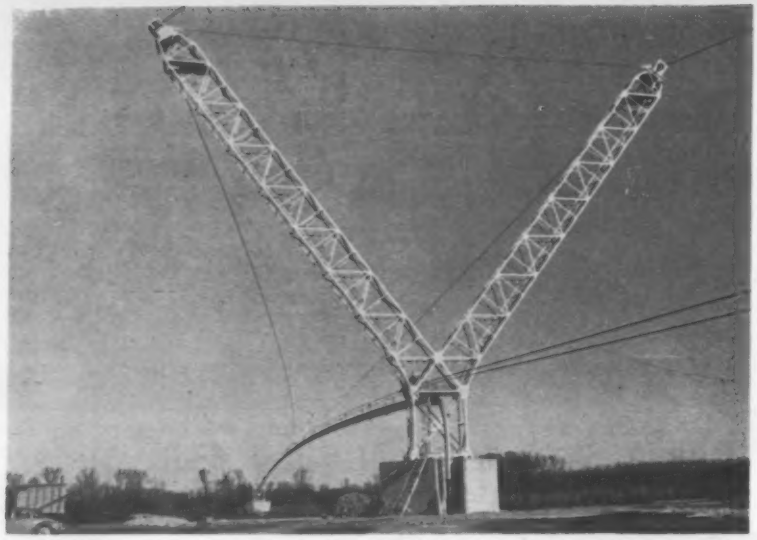
The floods followed in the wake of Mexico's heaviest rains in 80 years. Serious floods were reported in seven states: Sinaloa, Nayarit, Jalisco, Guanajuato, Nuevo Leon, Coahuila and Chihuahua. The rain also caused damage in other areas.

Numerous washouts cut the nation's major highways, according to the Communications Ministry. High water damaged roads in almost all parts of the country.

Mexico City floods are becoming more serious, paradoxically, because of recurrent water shortages, one local engineer told ENR. Areas in the central part of the city that used to be high enough to drain naturally, he said, are sinking about a foot a year because of heavy withdrawals of subsurface water during every dry season. Drainage is getting worse, as a consequence.

In addition to making the drainage problem more acute, the soil subsidence ironically makes remedial measures tough to carry out. City engineers say that a much-needed new sewer system can't be built until the city stops sinking. Settling subgrade would soon leave sections of pipe "hanging like chains," they say.

Temporary measures to be started right away include installation of two new local sewage pumping stations and a complete overhaul of the Gran Canal's walls in danger areas, city officials say. Future plans call for a new $5 million second-stage pumping station six miles from the flooded area, on higher ground. And city engineers also hope the city will eventually have a closed interceptor system instead of the unsanitary open canal.



V-Towers Support Suspension Bridge

A 1,500 ft span suspension bridge carries high-pressure gas in a 16 in. line over the Danube River near Zwerndorf, Austria. The main cables are carried by V-shape, trussed steel towers that rise 138 ft and have a spread of 162 ft, giving the structure lateral stability. For added rigidity, two prestressed cables were laid just above the gas line, meeting the main cables at midspan. The bridge is part of a project of the Austrian Oil Administration.

Speed Giant Telescope Awards

Special bidding and contracting procedures are speeding the start of construction on the Navy's big $60 million radio telescope for exploration of outer space.

A blanket of secrecy has hidden information on dimensions and quantities of materials. But it is believed that the new Naval radio research station at Sugar Grove, W. Va., will be able to penetrate the limits of outer space and detect objects four to six billion light years away.

• **Record breaking**—If this is true, the new telescope may be much greater in diameter than the 400 to 450 ft estimated by one official. The biggest such instrument reported is in Russia and has a 350 ft dia reflector. There's one in England with a 250 ft dia reflector.

The new U.S. telescope is being designed by Grad, Urbahn & Seelye, with aid from these consultants: Amman & Whitney, structural design; Loewy Hydropress, key elements of the mechanical drive; and Battelle Memorial Institute, electronics.

• **Awards are speeded**—The Bureau of Yards and Docks and its recently selected prime contractor are short-cutting customary methods so they can award major subcontracts before the two parties negotiate the fixed fee that will go into the master contract.

The speed-up system was in operation even before the bureau announced the prime contractor—a three-firm joint venture made up of Tidewater Construction Corp., Norfolk, Va.; Peter Kiewit Sons, Omaha; and Patterson & Emerson-Comstock, Inc., Pittsburgh. Bids already had been invited from all comers for the initial 1.5 million cu yd grading job to shape the site, some 30 miles west of Harrisonburg, Va.

Early advertising of this work is designed to gain two or three weeks of good weather for earthmoving. This will enable the successful bidder to get down to shale and sandstone for productive excavation during the winter. Acting for the joint venture, which will make the award, the Public Works Officer of the 5th Naval District, Norfolk, Va., will open bids October 14.

Keeping up the fast pace, the bureau and the prime contractor, within the next few months will advertise a series of other big subcontracts. Invitations are expected to go out in early November for the huge steel structure, in December for motor-driven machinery, in January for a large area of aluminum reflector panels and in March for the foundations of the circular track on which the instrument will move.

Red Boss Misinterpreted, Soviets to Continue Hydro

Russian Premier Khrushchev's recent allusion to a shift in emphasis from hydro to steam power development was taken by many to mean that the U.S.S.R. would cut back its current dambuilding program. But Soviet hydraulic engineers attending the recent International Congress on Large Dams in New York City say this is an erroneous assumption.

The engineers say the Premier was looking to the time when there could well be a change in the current energy picture as a result of recent discoveries of oil, gas and coal in the eastern region where hydro power is now being developed. These developments, however, will continue for some years to come, in the opinion of the Russian engineers.

The coal, which can be strip-mined, offers a particularly promising low-cost energy source. Unfortunately, say the Russian engineers, the deposits are in the same area where good hydro sites and good dam foundations occur.

Colorado Water Battle Now Up to the Judge

Two years of hearings in a legal battle among five western states and the federal government over Colorado River water have ended.

The water-starved southwest states of California, Arizona, Nevada, New Mexico and Utah are claiming a total of 11.7 million acre-ft while only 7.6 million acre-ft are available annually from the muddy river. The federal government claims 1.5 million acre-ft for Indian reservations and federal projects.

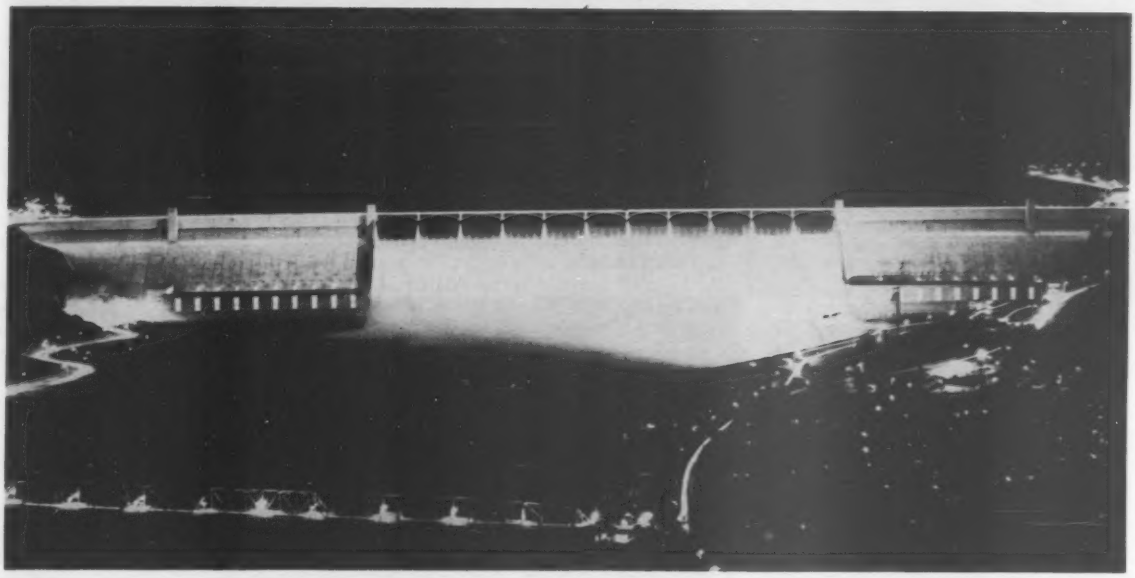
Simon H. Rifkind, a former New York federal judge named by the U.S. Supreme Court to preside as special master for the trial, took the case under advisement and set next June 1 as the deadline for final briefs. His decision will be reviewed by the Supreme Court.

In California, loss of Colorado water would mean the locating of new water supply sources and the construction of new supply projects.

Corps to OK Navigation Channel in Upper Columbia

The Corps of Engineers is ready to approve a $61 million program to provide for shallow-draft navigation in the Columbia River upstream from Priest Rapids Dam to Rock Island Dam near Wenatchee.

The project, yet to be authorized by Congress, would include the construction locks in Priest Rapids Dam as well as in the proposed Wanapum and Benjamin Franklin dams. Provision for locks has been made in Priest Rapids Dam, now under construction.



Grand Coulee Lights Up in a Bid for Glamor

Colored floodlights have been installed at Grand Coulee Dam to light up the central spillway for tourists—and to attract more of them. Twice as high as Niagara Falls and half as wide, the spillway cascades water from Lake Roosevelt into the Columbia River 350 ft below. Some 742 floodlights—1,500 watts each—play on the spectacle.

Restaurant Sits on Water Tank

A colossal concrete "wine glass" serves a curious combination of needs in the community of Oerebro, Sweden: The huge container holds the local water supply, and it also accommodates 150 diners in a restaurant on top. High-speed elevators in the shaft carry restaurant patrons up 250 ft to the dining room.

Between Trains, Tunnel Carries Auto Traffic

Politics makes strange bedfellows and dambuilding can promote unlikely combinations too. To wit: Great Northern Railway is sharing its tunnel temporarily with highway traffic past Rocky Reach Dam construction site on the Columbia River in Washington. Meanwhile, both highway and railroad are being rerouted to permanent locations above the future reservoir level.

Prestressers Share Production Secrets

To overcome growing pains, the youthful Prestressed Concrete Institute turned its attention to production and marketing of prestressed concrete products at its fourth annual meeting, held last week in Chicago. About 700 engineers and fabricators attended.

The sessions consisted mostly of panel discussions of topics with which the prestressers are now chiefly concerned. These were market and product development, research, pricing policies, yard handling, transportation and erection techniques, quality concrete, draping of strands in pretensioning, specification interpretation and inspection, and fire ratings and building codes. With the audience given an opportunity to question panel members, this type of meeting let many in attendance participate in determining what the industry's problems are and what the solutions might be.

• **Sell and stress**—In a keynote address, Charles Luckman, architect, Pereira & Luckman, Los Angeles, a former president of Lever Bros., offered this marketing advice:

"We believe that the manufacturers and service businesses who are going to make the most progress in the next decade are those who recognize the enhancement of selling power that comes through strong selling ideas. Experience has shown that in this scientific age, product superiorities of themselves may disappear rather quickly; but the strong sales idea sticks and grows."

Mr. Luckman proposed a slogan for the fabricators: "Sell and stress—sell the stressing, and stress the selling."

• **How to meet competition**—The panel sessions revealed prestressed concrete fabricators are experiencing intensified competition from producers of other structural materials. The panelists proposed production and product improvements and hard selling to meet the competition.

Contractors and designers accustomed to conventional concrete (4,000 psi or less) could not fail to be intrigued by the PCI discussions of quality concrete. The prestressers appear to take in easy stride production of concrete with 28 day compressive strength of 5,000 to 7,000 psi, even with lightweight aggregates. They consider their main problem maintenance of strengths of successive batches within a narrow range. They pointed out that achieving specified 28 day strengths is not difficult, since for production purposes they seek strengths exceeding 4,000 psi within 18 to 20 hours. This permits prestress to be applied the day after casting and thus early reuse of casting beds and forms.

As a step toward quality control of prestressed concrete, the PCI is considering certification of fabricating plants by the association.

• **Future potentials**—Looking for market-expansion opportunities, the PCI explored applications of prestressing to highway and airport pavements and longer-span bridges.

A. H. Gustaferro, Vulcan Materials Co., Chicago, said that in his opinion "a longer-span bridge is one that cannot be precast in a casting plant, but must be cast and either pretensioned or post-tensioned at the site." Mr. Gustaferro was chairman of the session on bridges.

The panel agreed that such bridges have not received public acceptance as yet, but expressed confidence that they would soon.

One of the panelists, Luis P. Saenz, consulting engineer, Havana, reported that during the last six years great strides have been made in Cuba in this type of construction. The first such bridge, built in 1952, had a main span of 250 ft. Three years later, a bridge was built with a 350 ft main span, the longest one in that country to date (ENR Dec. 27, 1956, p. 34). However, a prestressed concrete bridge now under construction over a 360 ft deep gorge in Cuba has a main span of 375 ft and eleven 100 ft spans. An unusual aspect of this project is that the tall two-column piers supporting these prestressed concrete roadway girders have a slenderness ratio of 40 to 1.

Mr. Saenz predicted that two prestressed concrete bridges to be placed under contract next year will have even longer spans. One will be a five-span continuous structure with a 525 ft main span, the other a three-span bridge with a 590 ft main span. Cuban designers, he said, also are investigating the feasibility of a prestressed concrete bridge of box-girder design with a central main span of 900 ft.

Mr. Saenz said that present codes should have less restrictive design requirements for prestressed concrete bridges. Designers need more freedom so they can increase their range of thinking and develop better and more economical structures.

• **New officers**—The PCI elected Peter J. Verna, Jr., Concrete Materials, Inc., Charlotte, N. C., president; Philip E. Balcomb, American-Marietta Co., La Grange, Ill., vice president; and Jacob O. Whitlock, Mid-West Prestressed Concrete Co., Springfield, Ill., secretary-treasurer.

For directors for 1957-58, the PCI chose Ben C. Gerwick, Jr., Ben C. Gerwick, Inc., San Francisco; Douglas P. Cone, Florida Prestressed Concrete Co., Tampa, Fla.; Randall M. Dubois, Freyssinet Co., New York City; George W. Ford, R. H. Wright & Son, Fort Lauderdale, Fla.; John K. Zimmerman, Pennsylvania Prestress, Inc., York, Pa.; and R. O. Kasten, Union Wire Rope Corp., Kansas City, Mo.

Waterborne Incinerator Burns Dock Waste

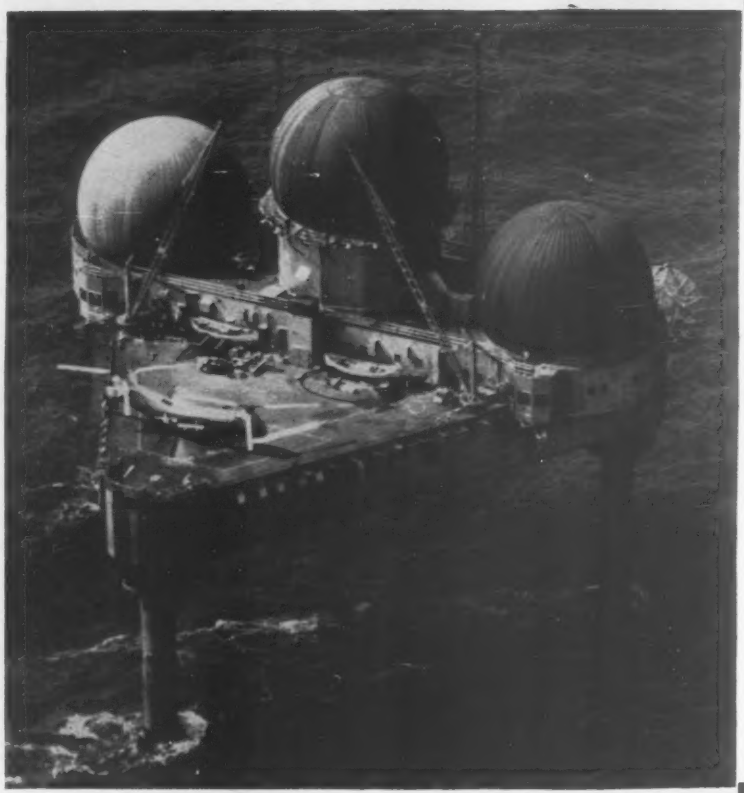
Hughes Bros. Inc., is burning waste at sea for waterfront demolition contractors in the New York City area.

Steel barges up to 200 x 40 ft in size are loaded at the dockfront with old wood piers, sheds and pilings. With loads up to 1,500 tons, the barges are towed just outside lower New York Bay, where the waste is set afire. The barge steel is protected by 18 in. of sand. A 3 ft steel coaming surrounds the burning material.

USS National Pipe

doing a job for National Defense aboard Texas Tower

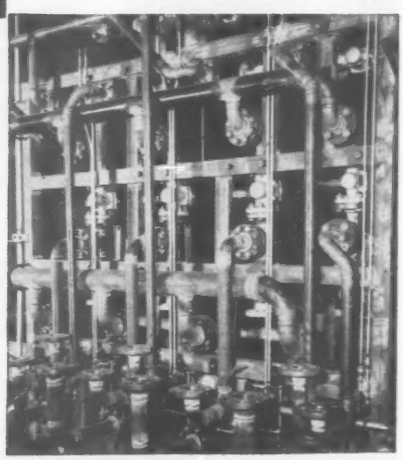
The main steam reducing station located on the bottom deck of the Texas Tower. All NATIONAL Pipe.



This man-made radar island stands on giant stilts 110 miles at sea off the North Atlantic coast. An important segment in our country's defense against surprise attack, the $13,000,000 Texas Tower is the first of five such "plane watcher" stations to be constructed. Approximately 9,084 feet of USS NATIONAL Pipe were used in the Texas Tower—for steam piping, chilled water piping, fuel oil piping, and compressed air.

Piping installed by Wallace Process Piping Company Inc., Norfolk, Va., as subcontractors to Steers-Morrison-Knudsen, Inc., New York City and Continental Copper and Steel Industries, Inc., New York City.

Flooding and evacuating piping panel—controls instruments on the flooding and evacuating system used in lowering the template at sea.



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Bank Plans $50 Million Skyscraper on Park Ave.

The Seagram Building and Lever House are getting a classy new neighbor on New York City's Park Ave.

The First National City Bank of New York plans a $50 million, 41 story office building at 399 Park—next door to Seagram and across from Lever House. The bank building will contain more than 1.5 million sq ft of space.

The facade will consist of glass and aluminum, with structural columns covered in a light gray limestone bound with metal. The mullions will be a natural colored aluminum; the spandrels will be in a darker gray.

The building will have recessed fluorescent lighting, acoustic treatment and air conditioning throughout. It will be served by 28 high speed, fully automatic passenger elevators.

The structure will serve as a centralized location for the bank's operating departments. It's expected to be completed early in 1961.

The site was originally intended for Astor Plaza. But the project developed by Col. Vincent Astor was shelved when the Astor group could not obtain sufficient financing. The First National City Bank bought the site last April.

George A. Fuller Co., is the contractor. Carson & Lundin and Kahn & Jacobs are the architects. Charles Mayer is the structural engineer. All are New York City firms.

Wesley W. Horner Dies, Former President of ASCE

Wesley W. Horner, senior partner of Horner & Shifrin, St. Louis, and former president of the American Society of Civil Engineers, died in St. Louis last week at the age of 75. With his passing, the fields of municipal and sanitary engineering lost one of their most prominent members.

Mr. Horner was associated with St. Louis in one way or another most of his life. He received a bachelor's degree in civil engineering in 1905 and his graduate degree four years later from Washington University, St. Louis. He later taught municipal and sanitary engineering there. He was chief engineer of the city's Sewer and Paving Division from 1918 to 1933. As a consultant, he planned many of the highway, airport, sanitary and flood control projects in the city.

On the national scene, Mr. Horner served as president of ASCE in 1946 and at one time was president of the American Public Works Association. In 1953, former President Herbert Hoover named him to a task force for study of federal activities in the water resources and power development fields.

85 Ton Concrete Door Shelters New X-Ray Lab

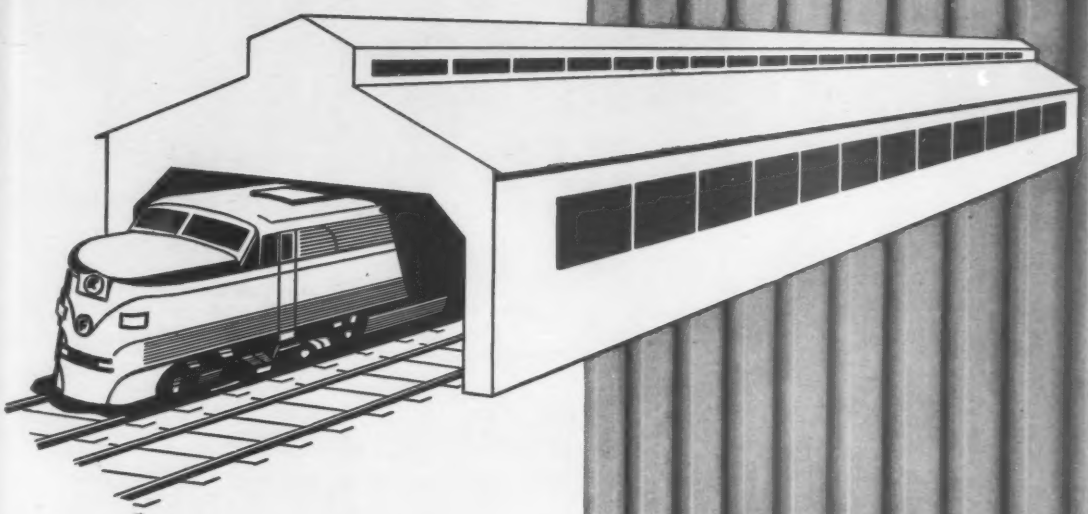
One of the largest mobile pieces of concrete in existence—an 85 ton solid concrete door—now protects a 24 million volt betatron, used for X-raying. The block is 13½ ft high, 18 ft wide and 5 ft thick. It's located in New Castle, Pa., at the Mesta Machine Co.

The X-ray tool was installed for inspection of steel castings. Shapes weighing 50 tons or more can enter through the doorway. They travel on a set of special platforms that run on track. Several cars are rigidly linked together to form a single electrically driven unit. The lead car supports the door (see sketch).

for RAILROAD STRUCTURES, too—

Ruberoid Corrugated Asbestos

SAVES MONEY THREE WAYS



The resistance of Ruberoid Corrugated Asbestos to acid, fumes, smoke and steam is a real benefit in railroad structures. In either roofing or siding, you *save money 3 ways* —

ONE, Ruberoid Corrugated Asbestos is an *economical material* to buy.

TWO, *construction costs are lower,* for the light weight of Ruberoid Corrugated Asbestos makes possible skeleton frame construction requiring less costly footings.

THREE, *maintenance costs are almost eliminated.* Ruberoid Corrugated Asbestos resists corrosion. Made of inorganic asbestos and cement, these strong sheets never need paint, are completely fireproof, last as long as the building itself.

For complete specification data, write The RUBEROID Co., 500 Fifth Avenue, New York 36, New York.

The RUBEROID Co.

ASPHALT AND ASBESTOS BUILDING MATERIALS

Acres of pipe in casting yard await installation in the tunnels of Pittsburgh sewer project.

Sewers Lined With High Strength Pipe fo

If 30 miles of tunnel now being completed for Pittsburgh's $100 million sewer project don't last forever, it won't be for lack of trying.

These intercepting sewer tunnels are being lined with reinforced pressure pipe precast with 7,000 psi concrete instead of the more normal 3,600 psi concrete. The tunnel is then "backfilled" with 3,000 psi concrete.

The Allegheny County Sanitary Authority departed from normal cast-in-place lining procedures to assure longer life. It's aiming for 100 year design life, instead of the usual 40 to 60 year life.

The pipe ranges from 24 to 126 in. diameter, with steel end rings and rubber gaskets. It's being installed in tunnels driven through rock and some soft material, and in 33 miles of open-cut trench. On open-cut pipe, a diaper joint filled with grout was used as an additional precaution against infiltration.

Before putting the pipe in production, several tests were made. Accelerated erosion tests with a sandblast machine were made on sections of pipe constructed with various aggregates and strengths and made by different processes. Strength and closeness of coarse aggregate to the surface proved the most significant indexes of the desired wearing qualities. The Sanitary Authority picked 7,000 psi strength concrete for the desired resistance to scouring. Pipe wall thickness also was increased to 7 in. for 72 in. pipe. For similar size pipe with 4,500 psi concrete, ASTM standards require 6 in. wall thickness.

More than $7 million worth of tunnel liner and interceptor pipes for the job was produced in two plants. Lock Joint Pipe Co. manufactured approximately 30,000 feet of pipe from 72 to 126 in. diameter and 3,400 feet of subaqueous pipe from 14 to 24 in. diameter. Allegheny Concrete Pipe Associates manufactured 245,000 feet of pipe from 24 to 66 in. diameter.

Lock Joint Pipe set up a 200 ton concrete plant on a 15 acre site to produce its portion. The pipe was cast, cured and stored in the yard. Sixty plywood boxes were used to enclose the pipe during steam curing. As each pipe section cured, the boxes were lifted and placed on a section just cast. This method eliminated the need for moving the pipe and kept damage and breakage risks at a minimum.

The authority maintained a rigid inspection of production to assure quality control. Tests were made for infiltration, absorption, density and strength. Pipe was tested to destruction according to ASTM standards for reinforced concrete culvert pipe with the loads to produce the crack higher than usual. Strength and density tests were run on ½% of all pipe.

Whenever seven-day concrete cylinders failed, cores were cut from the pipe and tested for compression at 28 days. Infiltration tests were required on 1% of all pipe. Whenever a section failed the test, all pipe produced the same day was tested. (The infiltration test required no visible infiltration after 24 hours under a 100 ft head.) Absorption could not exceed 6% in any case.

In driving the tunnels, excavation was kept as close as possible to the minimum clearances for installing liners. This was done to reduce the volume of concrete backfill required. Tunnels

Tight joints keep infiltration to almost nothing.

fo Longer Life

ranged from approximately 15 ft in diameter for the 126 in. pipe to 3 x 4 ft for the smallest pipe, 24 in. diameter. The cost of tunnel excavation, concrete liner and backfill varied from $231 per lin ft for 72 in. tunnel liner to $358 for 126 in. tunnel liner pipe, exclusive of tunnel support.

• **Tunnel driving slowed**—The largest tunnel in the system is being driven by Dravo Corp., Pittsburgh. This tunnel will carry the main interceptor from Pittsburgh's Golden Triangle at the head of the Ohio to the treatment plant three miles downstream. The tunnel runs along the river's north bank about 100 ft below ground. Both water and geology combined to keep progress behind schedule.

Roof bolts have been used extensively since the rock here and almost everywhere else on the project is stratified horizontally. It was feared that the metamorphosed shale would disintegrate rapidly when exposed to air and moisture. But many of the tunnels have been open over two years without substantial rock falls or the need for

TUNNEL is backfilled with 3,000 psi concrete mixed at the surface and piped in. Two sections of liner pipe are backfilled at a time.

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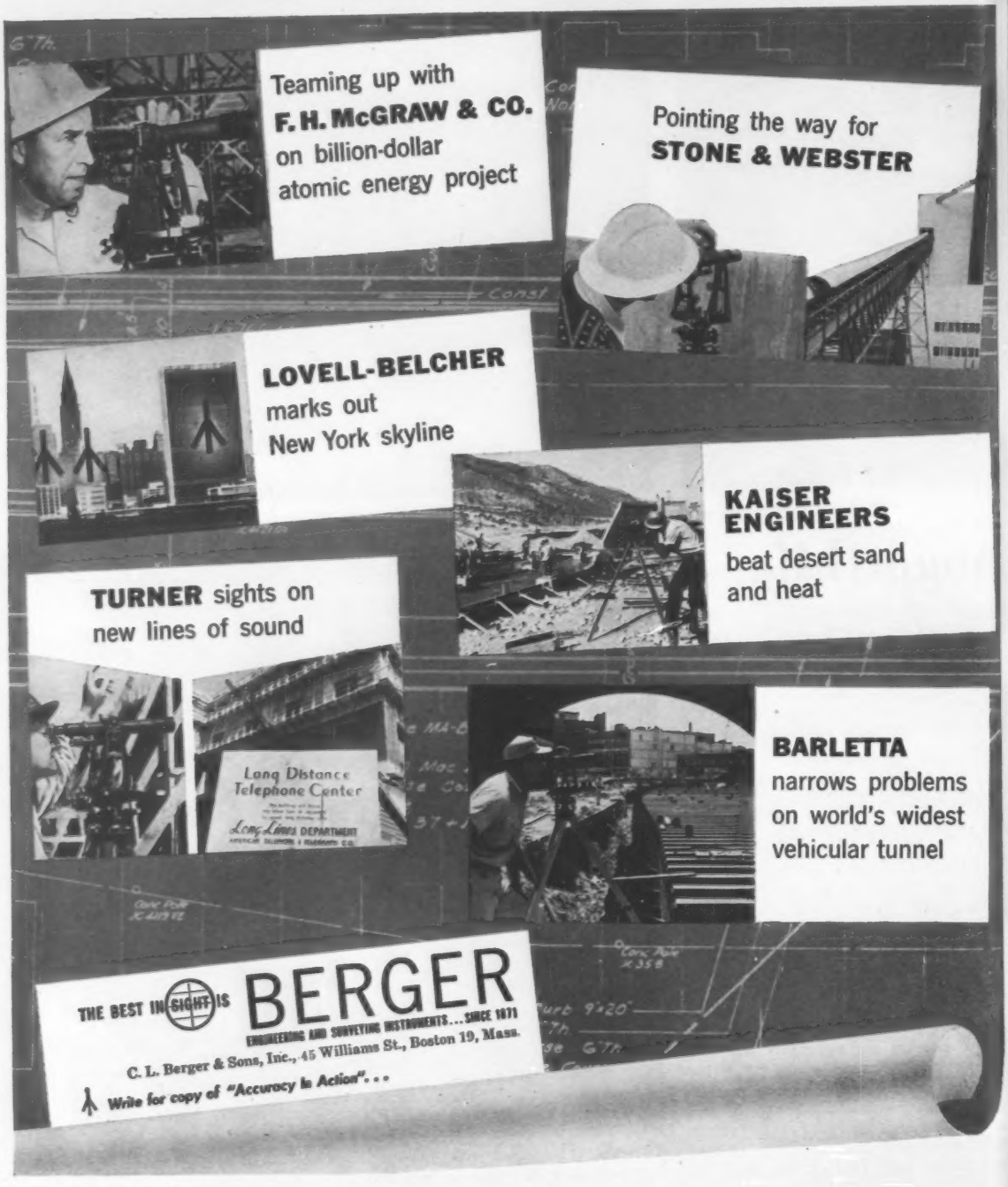


STREAM BED provides space for open cut interceptor in highly developed area. One side of stream is deepened and the other side filled to get working room.

more than ordinary scaling. No protective coating has been used in the tunnels.

Tunneling progress has been slowed due to the poor rock quality. Steel roof supports often are required at two foot centers. Spilling is necessary also. Water is always present, frequently in volumes difficult to control and grout off. Because of the slow progress, several additional access shafts were needed to provide more working faces.

In tunnels along the upper portion of the interceptor, Mole Constructors, Inc., a joint venture, needed ribs and liner plates for a mixed face that held driving to 2 to 3 ft per day. Because of the horizontal lie of the rock, the tunnel had to advance about 3,000 ft before passing through the mixed face into a full face of soft running material, which required compressed air between 10 and 17 psi.

The original pressure of 17 psi dropped to 10 psi as the heading was pushed more than 3,800 feet beyond the air lock. The contractor accomplished this by using substantial amounts of grout and solidifying solutions to shut out the water, slow the escape of air and stabilize the ground.

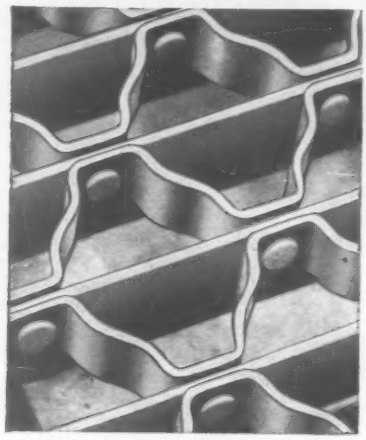
Coal seams were encountered in a number of tunnels. This required carefull attention to ventilation and continual checks to keep coal gases below dangerous levels. In spite of these precautions, a number of explosions occurred—but there were no fatalities. Only one fatality occured in driving more than 30 miles of tunnel. On a job of this type and magnitude, this record is a handsome payoff for an intensive safety campaign waged by the contractors and the Sanitary Authority.

• **Placing the pipe**—Liner pipe is brought from the access shaft on special dollies running on track used by the muck carts in driving the tunnel. Pipe is lifted from the dolly by manual jacks. The pipe is supported on wood or concrete wedges as it is adjusted to grade. Adjustment is not more than a fraction of an inch, since tracks were carefully laid to grade in the concrete floor of the tunnel. Extensive adjustments are ruled out because of the pipe's weight—up to 40 tons—and the cramped quarters.

After the pipe is joined and the final grade checked, concrete is backfilled between the pipe and tunnel wall. An average of 1.2 cu yd of backfill is used per lin ft of tunnel. Most of the concrete is pumped into the tunnel through ceiling downshafts, which will be used for sewage entries when the system is in operation. The concrete is mixed at the surface. During the first stages of backfilling, concrete grout with no coarse aggregate was used. It was pumped 2,800 ft at one site and 1,300 ft at another with special pumping equipment. The Sanitary Authority later found that the high cement and fine aggregate increased the shrinkage of the backfill and discontinued the use of a grout mix.

In Mole Constructors' tunnels, water was controlled more by pumping than by grouting. In particularly wet areas, backfill concrete was tremied into place. To keep it from washing out, the space behind every second section of installed pipe was bulkheaded and the concrete

New "CK" BRIDGE DECKING ENDS WEAVING OF CARS



Modification of the original Irving Type V Decking has eliminated "weaving" on open mesh steel floors. The improvement is effected by a 3/16" elevation difference of the crimped bars over the straight bars.

"CK" Decking, successfully field-tested for 4 years, has the same advantages of safety, strength, durability and self-maintenance as standard Type V Decking.

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$100 MILLION SEWAGE PLANT, now 75% complete, will treat 150 mgd by a new process of sludge incineration.

placed behind it until a low pressure was developed. When the concrete set, this bulkhead was removed and the next two pipe sections installed. The procedure has given very good results.

• **Stream pipe laying**—In the outer reaches of the system, interceptors are laid in open trenches. In picking up the sewer outfalls along two creeks, the trenches were made along the banks or in the stream itself. Cuts in the streambed were made where property development along the shore left no room for equipment. To get space for equipment in restricted areas, half of the stream bed was deepened by excavation and the material piled on the other half.

The deepened side carried normal stream flows, while the filled side served as an access roadway and solid platform for trench digging operations.

Cuts made in the filled portion were well below normal stream depth. Pumps were used to keep the trench free of water, since the authority insisted that all pipe be laid in the dry. Sheet piling was used along with pumps to control water and to hold the sides of the trench. A subbase of crushed slag supported the pipe in the trench, and also helped control the water.

Pipe laid in the stream bed was made with extra thick walls to counter buoyancy effects. When the pipe was laid close to normal stream bottom, a concrete encasement was cast around the installed pipe to protect the interceptor against damage from floods and long-time erosion. After the interceptors were laid, the stream beds were returned to their original condition.

Over 31 miles of open-cut pipe were constructed, ranging from 15 to 54 in. In addition, more than seven miles of connecting sewers and force mains were constructed. Pipe was laid and jointed with such care that when most contracts were completed infiltration was found to be zero. In the 31 miles completed to date, total infiltration is less than three gallons per minute.

Besides the interceptors, other major parts of the system are the treatment plant and diversion structures. The latter will divert the sewer flows into interceptors, or by pass portions of the flow into the rivers during storms. Of 252 diversion structures in the system, some 225 are built and most of the rest are 95% completed.

The treatment plant, which is designed to handle 150 mgd, is 75% completed. The substructure and superstructure are substantially completed on all the main elements of the plant. Most of the remaining work is mechanical and electrical installations. Target date of March, 1959, is still in sight. It was set when the project was started over 2½ years ago.

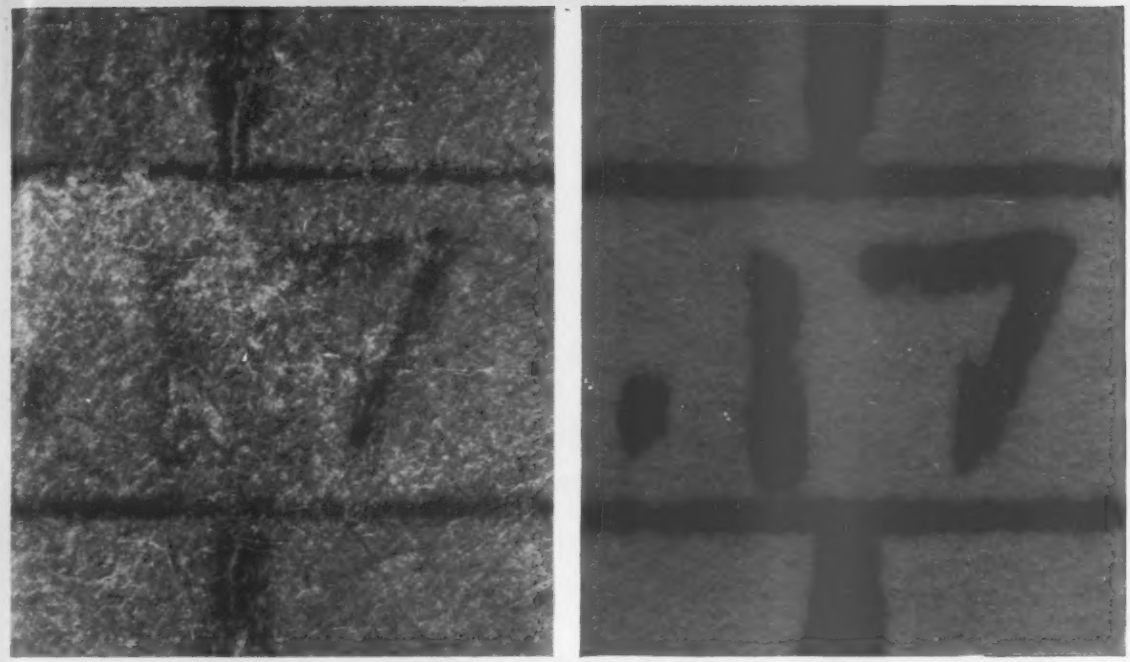
For the Allegheny County Sanitary Authority, John F. Laboon is director and chief engineer, Lawrence M. Gentleman is deputy chief engineer and Richard J. Dougherty is construction engineer. Major contractors were named in a previous article (ENR April 11, 1957, p. 46).

Coupling Cuts Pipe Laying Time

Dravo Corp., Pittsburgh, is making good use of a quick coupling, thin-walled pipe to carry compressed air into its sewer tunnels on the Allegheny County Sanitary project at Pittsburgh. The coupling and the pipe cut in half the time and cost of installing conventional pipe, says the contractor.

The coupling consists of a flexible gasket and two semicircular clamps that fit over the gasket and pipe ends to be joined. The 13 gage, 4 in. dia pipe is not threaded. Instead, a groove is rolled at the ends—either in the mill or in the field. The clamps are tightened by bolts-compressing the gasket and sealing the joint. The clamps fit into the groove mechanically locking the pipe sections together.

The pipe carries air at 100 psi. Dravo is using more than 40,000 linear ft in 20 and 24 ft sections. Victaulic Corp. of America supplied the couplings.



These photomicrographs show effects of identical handling on (l.) a pencil drawing and (r.) an Autopositive Paper intermediate made from same drawing

Don't let your drawings smudge away!

JUST FILING a pencil drawing—and pulling it out of the files—will in time mess up your sharpest creation. *Make prints* from the drawing . . . use it for reference, and you speed the need for retracing, increase the possibility of reading errors.

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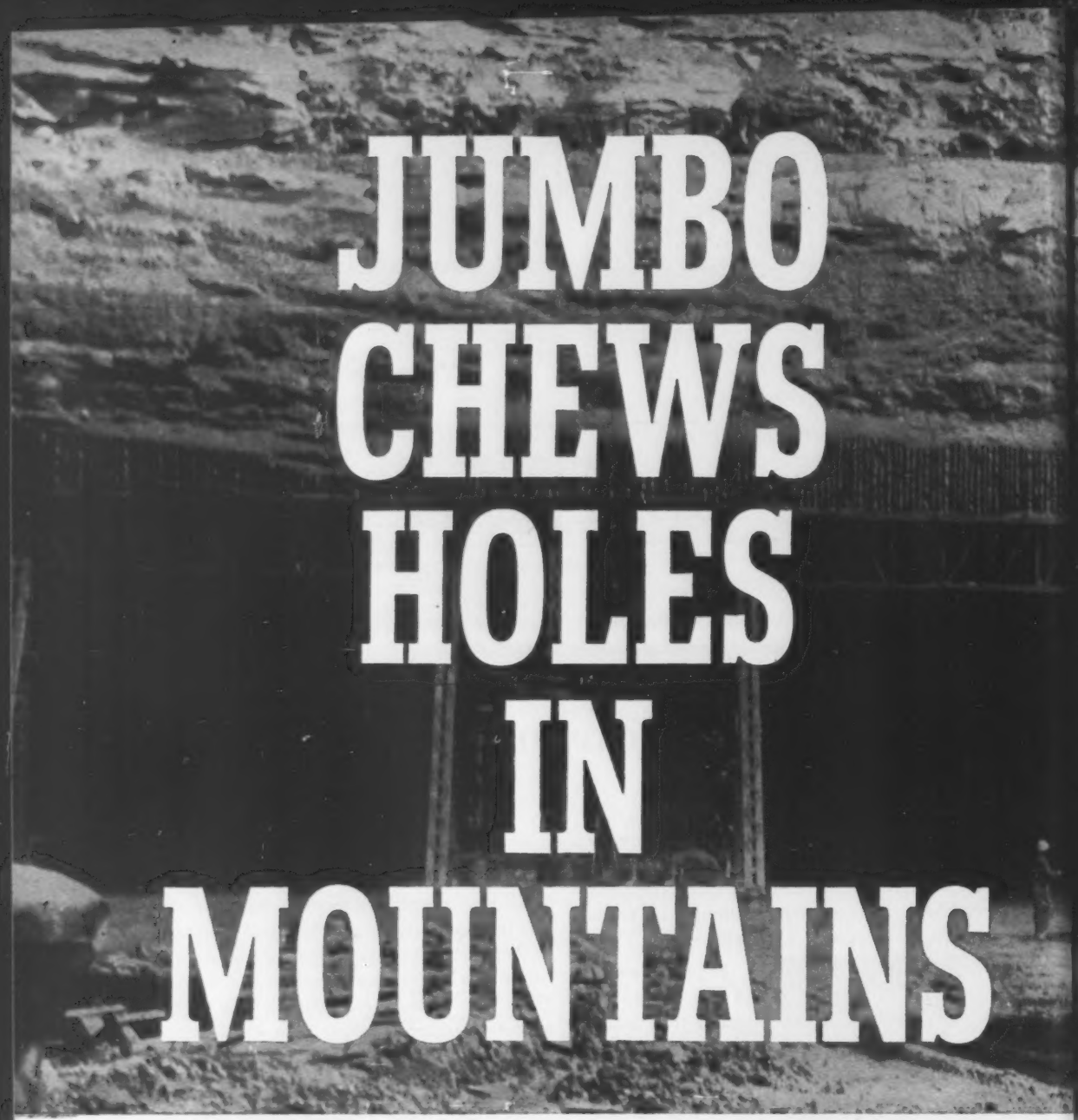


JUMBO CHEWS HOLES IN MOUNTAINS

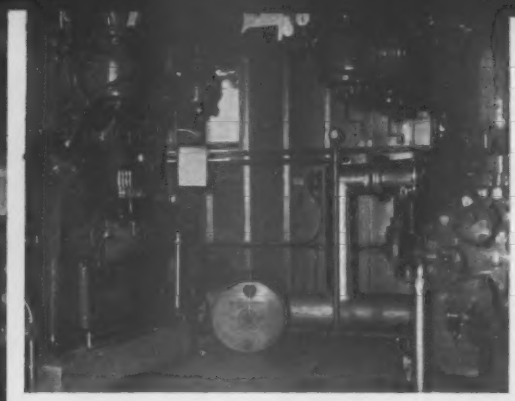
. . . with no unscheduled downtime, thanks to Texaco

This Jumbo drilling rig is Merritt-Chapman & Scott's solution to the Fort Pitt Tunnel Project, Pittsburgh.

Designed and built for the job by M-C&S, the Jumbo stands almost as high as a two-story house, mounts 12 pneumatic hammer drills capable of taking a 10-foot bite of solid rock. This truck-mounted drilling machine was designed to operate alternately in Fort Pitt Tunnel's twin tubes, each running 3,600 feet through solid rock.

This Jumbo is 100% Texaco Lubricated—and it hasn't had one minute of downtime due to lubrication. The reason for this fine performance is the combination of qualities in Texaco Rock Drill Lubricant EP: a highly refined mineral base with extra extreme-pressure and anti-corrosion properties. Texaco Rock Drill Lubricant EP protects against rust and wear even under the most severe conditions of load and moisture.

Texaco protects compressors, too. The two heavy-duty units that drive the Jumbo's drills are reliably protected against rust, sludge and foam by Texaco Regal Oil E R&O. This specially refined and fortified lubricant keeps discharge passages clear, keeps valves working properly and cuts wear to a minimum.



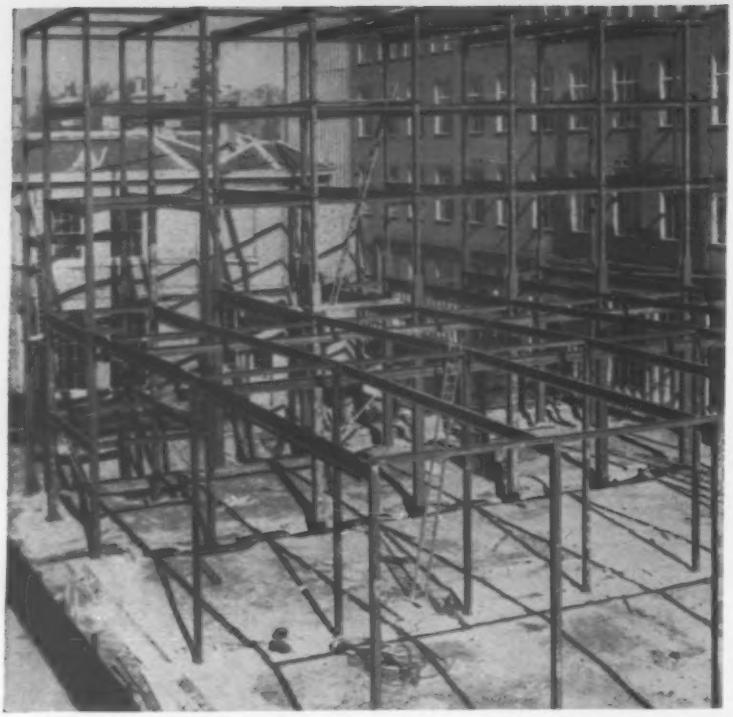
THESE ARE JUMBO'S "MUSCLES"—twin Joy air compressors, lubricated with Texaco Regal Oil E R&O to assure uninterrupted heavy duty performance.

THIS IS M-C&S' JUMBO—a 12-headed mobile drilling machine. Big solutions for big problems are typical of Merritt-Chapman & Scott—the company that built the 34-pier substructure of Michigan's miraculous Mackinac Bridge, longest suspension span in the world.

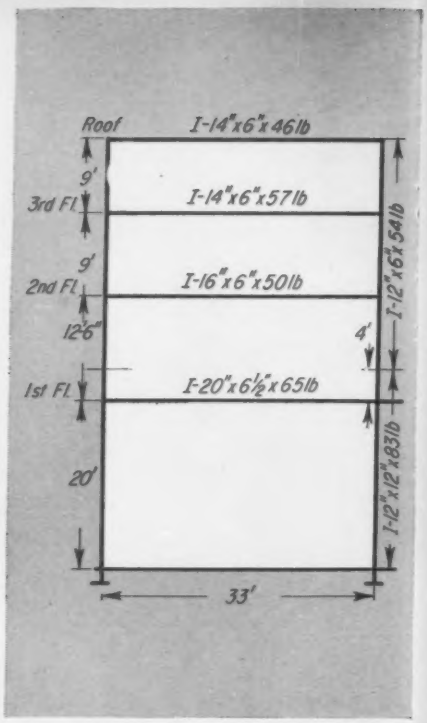
Proved performance like this has made Texaco the choice for lubrication of the whole Fort Pitt Tunnels Project. To find out how your operation can become more economical and more dependable, call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)



WELDED FRAME designed by new method is unusually light; yet its beams deflect less than simple beams designed by elastic theory.



STEEL SIZES (British) given above for a frame result from advances in plastic theory.

Four-Story Steel Frame Is Designed by Pla

M. R. Horne
Department of Engineering
University of Cambridge
Cambridge, England

A four-story building with a welded structural steel frame designed by plastic theory has been completed at Cambridge.

Plastic design is simpler in many respects than methods based on the commonly used elastic theory. It also makes possible design with consistent safety factors and offers an opportunity to cut steel costs.

The plastic theory assumes formation of "plastic" hinges in continuous structures at points of peak bending moment before failure occurs. These hinges convert continuous beams and frames into statically determinate structures, capable of carrying even more moment after the hinges form. The design load is determined by applying a safety factor to the ultimate load computed on the basis of this assumption, which has been justified by tests.

In the U. S., plastic design theory has not been advanced to the point where frames more than one story high are permissible.

In England, plastic design of continuous frames for multistory structures has been delayed by two factors:

1. Various complications arise when plastic theory is applied to frames with members carrying high axial loads.
2. There has been some reluctance to attempt field welding.

• **Design barriers broken**—Both these difficulties were overcome in the design and construction of a four-story addition to the Engineering Laboratory at the University of Cambridge. This extension and an adjoining single-story laboratory structure compose the central wing of what eventually will be an E-shaped building above ground level. The main portion was completed in 1952.

The four-story wing is about 77 ft long and one 33 ft bay wide. The 33 ft rigid frames comprising its structural frame are spaced 11 ft c-c. Story heights vary; the first story is 20 ft high, the second 12 ft 6 in., and the remaining two, 9 ft.

Floors are cast-in-place concrete. The roof is steel deck spanning the 11 ft between frames. Exterior walls are brick.

The 33 ft steel rigid frames were designed with a safety factor of 1.75 applied to the computed ultimate load to determine the allowable combined live and dead loads. Wind loads are not critical, because lateral forces can be assumed to be taken by the exterior wall at the outer end of the wing and by the existing building at the inner end. Therefore, the frames were designed for vertical loads only, the columns being assumed restrained against sway at each floor level.

• **Collapse conditions**—Beams in the four-story wing were designed as fixed-end. The theoretical collapse condition for them would occur when plastic hinges formed at both ends and at midspan.

In general, the columns were designed by a refinement of the elastic theory [Horne, M. R., "The Stanchion Problem in Frame Structures Designed According to Ultimate Carrying Capacity," *Proceedings*, Institute of Civil Engineers, Part III, Vol. 5 (1956), p. 105]. However, the top-story columns were designed for theoretical collapse condition involving full plasticity at one end [Baker, J. F., Horne, M. R., and Heyman, J., "The Steel Skeleton," Vol. II, Cambridge University Press (1956), Chap. 15].

• **Large steel saving**—Weights are compared in an accompanying table for a single frame designed by plastic and

CONNECTIONS DIFFER from conventional in column-bracing requirements—here, a K-stiffener is used for the web (arrow).

SIDE PLATES (arrow) reinforce exterior columns at upper-story connections to prevent web shear failure.

by Plastic Theory

elastic theory under several conditions. Included are the effects of limitations placed on depth of third floor and roof beams for architectural reasons.

With the depth limitations, plastic design required 19% less steel than elastic-theory design. Without these limitations, the savings would have been 16%. With restricted beam depths and deflections limited to acceptable values, the saving is 29%.

For the design without the limitation on beam depth, the deflection for the third-floor beams is 31% less for the plastic design than for the elastic.

• **Columns reinforced**—Two types of welded beam-to-column connections were used in the four-story frame:

1. At first-floor level, column webs were braced with K stiffeners.

2. At second and third floors and roof level, side plates were added to the columns.

Such reinforcement is required for exterior columns to prevent shear failure of the column web. Interior columns with beams of approximately equal depth on the flanges would not require reinforcement for this purpose.

No difficulty was experienced with field welding. The welders worked simultaneously on opposite ends of each beam. Virtually no distortion of the frame has been detected, the movement at the top being less than ¼ in.

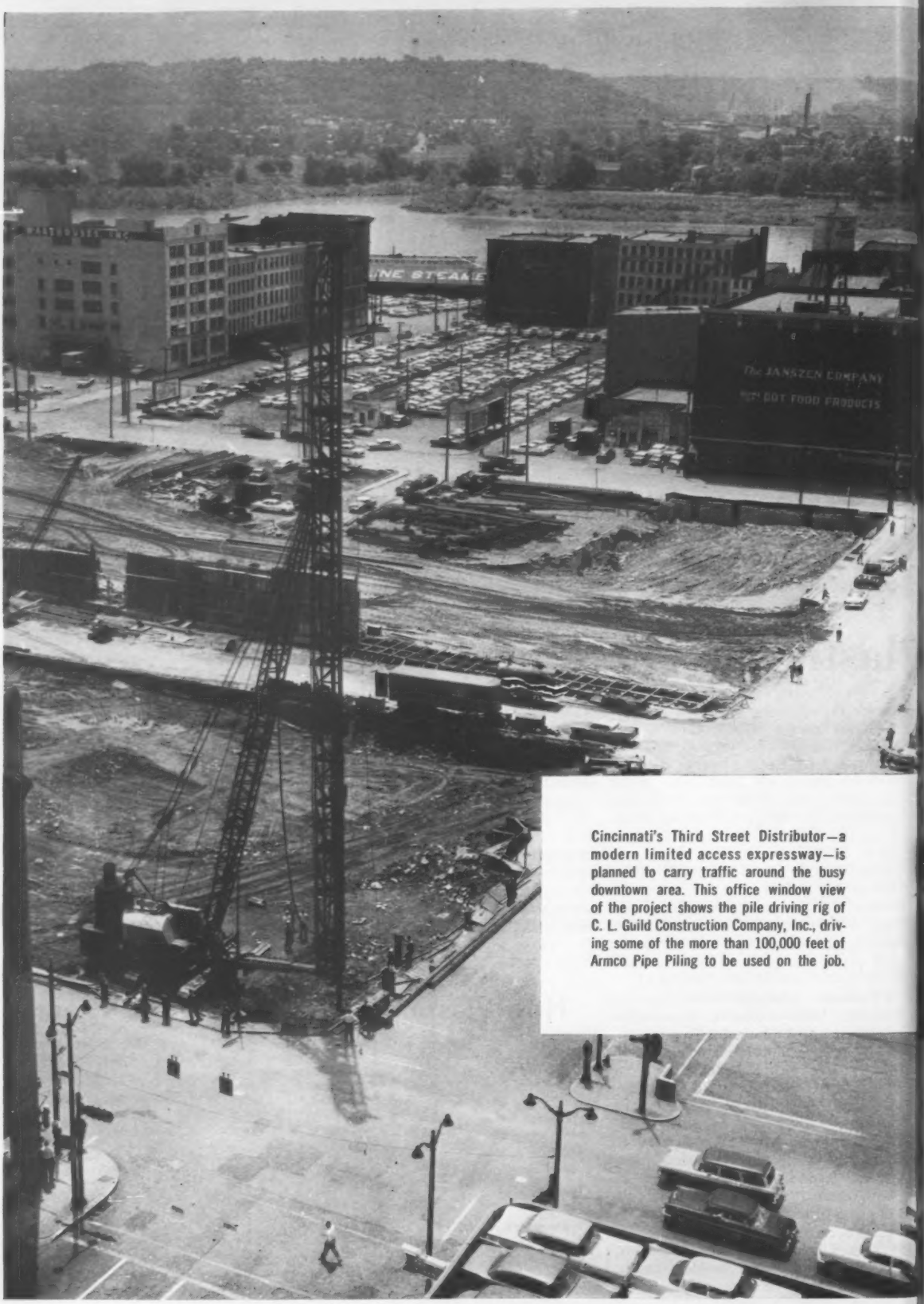
No doubt beam-to-column connections less elaborate than those used for this frame are possible. Recent tests at Cambridge have shown that suitably designed connections with only fillet welds are capable of developing the full plastic moments of large, rolled beam sections.

• **Incentives**—Experience with this building leads to the conclusion that weight savings resulting from use of continuous frames are worth while even for single-bay buildings. For multibay buildings, the interior columns usually would not be heavier than for designs with simply supported beams; so even greater overall economy should be possible with plastic design. Furthermore, the advantages offered by the shallower beams obtained with plastic theory should be a big incentive to greater use of the new technique for tall buildings.

For the new laboratory wing, Easton & Robertson were the architects, and R. T. James and Partners, the engineers, in collaboration with Prof. J. F. Baker, Cambridge University, and the author. Sindall Ltd. was the general contractor, while Harland & Wolff fabricated and erected the steel frame.

How Plastic Design Saves Steel Weight

	Designs with Limited Depths			Depths Not Limited	
		Simple Beam			
	Plastic Design Used	Deflections Unlimited	Deflections Limited	Plastic Design	Simple Beam
Weight of beams per frame (tons)	3.12	4.90	5.90	2.96	4.45
Weight of columns per frame (tons)	2.98	2.62	2.62	2.98	2.62
Total weight per frame (tons)	6.10	7.52	8.52	5.94	7.07
Working-load deflection (inches)	0.87	1.71	1.22	0.77	1.11
Ratio deflection to length (inches)	1/455	1/232	1/325	1/514	1/356



Cincinnati's Third Street Distributor—a modern limited access expressway—is planned to carry traffic around the busy downtown area. This office window view of the project shows the pile driving rig of C. L. Guild Construction Company, Inc., driving some of the more than 100,000 feet of Armco Pipe Piling to be used on the job.

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Restricted right-of-way, coupled with the need for slope control, presented a problem that was solved by Armco Bin-Type Retaining Walls in Boston, Kansas City and Pittsburgh. All-steel bolted construction of Armco Walls eliminates the threat of cracking or breaking under load. Slope stability is assured.

On Detroit, Chicago, Boston, Dallas and many other expressways strong, safe, easy-to-install Armco FLEX-BEAM Guardrail protects both motorists and property.

Country-wide, you'll find the whole family of Armco Construction products doing important jobs on expressways. Dependable Armco Drainage Structures, featuring the flexible strength of corrugated metal, are a consistent choice for these downtown traffic expediters. You'll find, too, Armco Bridge Plank, Water Control Gates, Steel Sheeting doing key jobs. Want complete product data? Write us, outlining your construction project or problem. Armco Drainage & Metal Products, Inc., 5988 Curtis Street, Middletown, Ohio. In Canada: write Guelph, Ontario.

Boston Circumferential Highway (Route 128) approach has protection of FLEX-BEAM Guardrail. Total project required thousands of feet of this rugged rail.

Armco Bin-Type Retaining Wall will hold fill for new expressway . . . keep it from encroaching on nearby railroad right-of-way. Interconnected bins are filled with earth before backfilling.

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Simple steel "sled" positions wire mesh for slip-form paver.

Slip-Form Paver Lays Reinforced Road

A slip-form paver using a "sled" to position wire mesh in front of the paver has successfully laid reinforced concrete pavement, reports the Colorado State Highway Department.

Department officials say it is the first time to their knowledge that a slip-form paver has put down reinforced concrete. Contractors who designed the sled are now attempting to obtain a patent on their idea.

(The slip-form paver is in effect a "formless" paver. It advances between guidelines and drags behind it a slip or moving form of sufficient length to allow the concrete to set up. Savings of 25 to 30 cents per yd over conventional paving trains have been claimed for it, ENR Sept. 6, 1956, p. 53.)

Structurally, the sled is a large steel framed U with open ends attached to the forward arms of the paver. As the paver advances, the projecting sled raises the mesh ahead, allowing the concrete to surround the reinforcing.

On the sled's first job, paving specifications called for welded wire fabric reinforcement to be placed 2 in. from the surface of the 8 in. slab for a 24 ft roadway. The usual method in such a case is to lay 6 in. of concrete, back up the paver, put in steel, place another layer and then use vibrators to bond the two layers of concrete.

However, a slip-form paver does not allow backing up to lay the second course after the reinforcing steel has been placed. Thus the reason for the sled.

• **What it is**—The sled was manufactured locally to specifications provided by the contractors.

Outside members of the U are 6 in. steel box girders. The front end is a 6 in. I-beam welded to the girders.

Eight-inch running wheels are placed at the forward corners of the sled and two 6-in. wheels under the center of the I-beam. The sled is attached to the paver with ball and socket joints.

Eight 10 ft long runners are set laterally between the box girders and attached to the I-beam in front by hinged joints. They are made of 6x¼ in. steel set upright. Their back ends drag along the ground as the sled is pushed forward.

Pipes are placed along the top of the I-beam to let the mesh pass over easily.

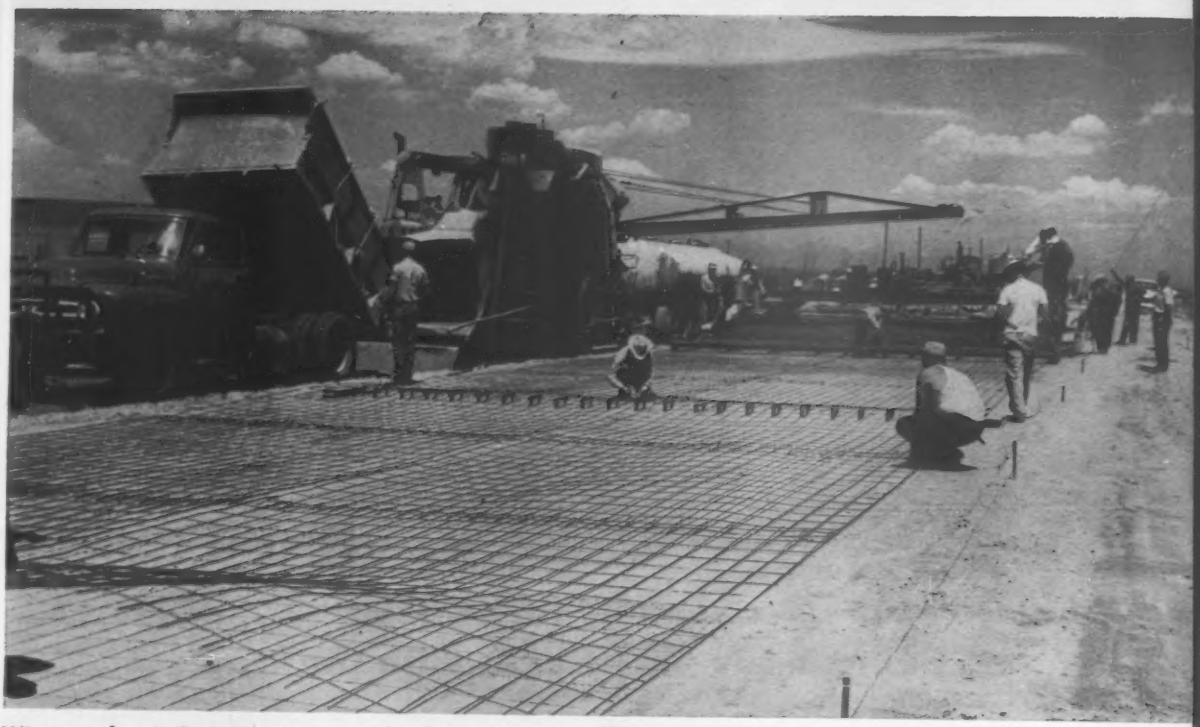
When first used, the sled pushed and bent the row of dowel bars that tie down the wire mesh. The remedy was small wood ramps alongside the rows of dowels. The corner wheels ride up on the ramps, raising the front end of the sled over the bars. The mesh is then tied down.

• **It works fast**—The sled makes for a fast paving operation. The contractors averaged 1,650 lin ft a day on the reinforced roadway compared to an average of 2,000 lin ft they hit on nonreinforced concrete.

Had the work continued, the speed of progress would have equaled that maintained by the paver for nonreinforced concrete, say both the contractors and Paul R. Morley, resident engineer for the highway department.

The work was done on a one mile section as an experiment during concrete paving of 15.3 miles of U. S. 87 near Castle Rock, Colo. (ENR May 29, p. 50). A $1 million contract was awarded on a combined bid from Western Paving Construction Co. of Denver and Roberts Construction Co. of Lincoln, Neb.

The reinforced section was described as: "One mile of concrete pavement with welded wire fabric reinforcement. One-half mile of this section to include style 6x12¼ fabric with sawn joints spaced 61 ft 6 in. centers as presently specified in the plans. The other half-mile is to include welded wire fabric reinforcement, style 6x12-00/4 with sawn joints spaced 106 ft 6 in. centers. This spacing is based on 16 in. long mats with 12 in. overlap and 3 in. reinforced space to each joint."



Wire mesh reinforcement is stretched out ahead of paver.

Wood ramp lifts front end of sled to clear tie-down bars.

For shallow fill or deep Beth-Cu-Loy pipe flexes with the load

Because galvanized corrugated Beth-Cu-Loy pipe is made of steel sheets, it is not only strong, but flexible. So whether the fill is shallow or deep, a Beth-Cu-Loy pipe has the unique ability to "give" with the fill and transmit the load around its entire periphery.

Rigid pipe cannot flex with the load, and thus is unable to transfer any appreciable portion of the load to the surrounding material. The bulk of the pressure is exerted through the vertical axis of the pipe. That's why many states actually specify the use of sheet metal pipe such as Beth-Cu-Loy under fills of less than 2 ft or more than 15 ft.

Flexibility, of course, is only one advantage of galvanized Beth-Cu-Loy culvert drainage pipe. The zinc coating (2 oz triple spot test) provides long resistance to corrosion. The pipe's light weight permits easy handling and quick installation of long pipe lengths, and reduces shipping costs. Field joints can be made in minutes, with no time out for setting or curing.

Bethlehem does not manufacture culvert pipe, but does supply Beth-Cu-Loy (copper-bearing steel) sheets to pipe fabricators. If you would like further information about Beth-Cu-Loy, or the pipe made from it, ask your fabricator for a copy of Bethlehem Booklet 425-A.

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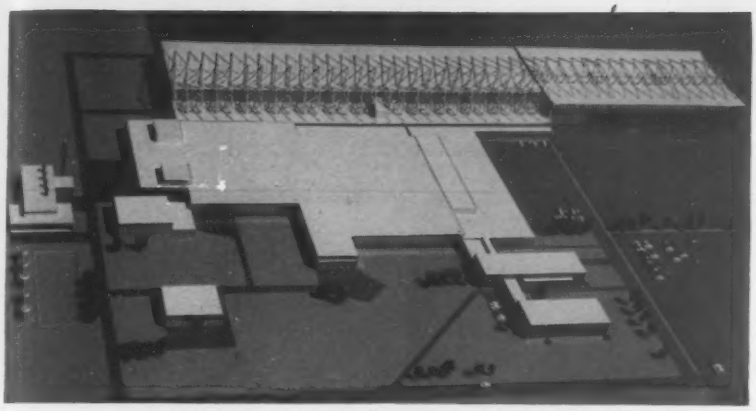

Montreal Gets Jet-Age Hangar

An 840 ft long hangar with 170 ft cantilever roof will be built for Trans-Canada Airlines at its new $20 million Montreal Airport maintenance base. The hangar (at left in picture) is designed to shelter the giant DC-8 jet airliners, which the company will put into service in 1960.

The interior will be completely free of columns so that the big jets can be maneuvered freely inside. (The DC-8's are 150 ft long, have a 139 ft wingspan and a tail that towers 42 ft above the ground.) The roof of the main hangar will be supported by 28 exposed steel trusses spaced 31 ft apart. The roof deck will be hung below the open steel grid. The hangars will be equipped with sliding doors 50 ft high that can be opened to any width.

The base also will include offices, supporting shops, store and engine test house and flight simulators.

Work is now under way clearing the 80 acre site of the base at the airport and extending a road to it for access. Construction will start late this year and the base is scheduled to be ready for operation late in 1959.

The architect is Ross, Fish, Duschenes & Barrett, Montreal. The only construction contract let thus far is for the access roads, to H. J. O'Connell, Ltd., Montreal.

Face Lifting in Buenos Aires

Abolishment last year of municipal height restrictions are producing a free-for-all skyward race by builders in Buenos Aires.

Apartment buildings, 20 to 40 stories high, are mushrooming in all parts of the city. But it is Buenos Aires' main street, the Avenida Corrientes, that is getting the most spectacular face-lift.

Construction is presently under way for three buildings along Avenida Corrientes—two of them will top the city's tallest structure, the 410 ft Atlas Building.

One of the buildings is a 426 ft two-tower commercial and residential center costing $6 million. It will include some 150 shops and a 700 seat movie house on the ground level. Two of the building's floors will hold a garage with 800 parking spaces. Concrete columns will rise 48 ft above the ground level to support twin towers. The towers will contain 245 apartments distributed over 36 and 30 floors, respectively.

A 417 ft office and apartment building will rise across the street. It will have room for 420 apartments, a commercial center for 190 shops, plus a 1,000 seat theater.

The third new building on the avenue will be another $6 million, two-tower structure, with a height of 397 ft—40 floors above street level—and four basement floors. A commercial center with 140 shops will be housed in three interconnected floors. The stories above street level are reserved for office space.

The tallest tower is to be topped off with a restaurant and nightclub complete with heliport.

Architects for the three buildings, respectively, are: Aslan Y Ezcurra; Staio Bonet, Jacobs & Falomir; and M. Abravanel, F. Calabria and M. Lejneff. Completion of the three projects is planned for 1962.

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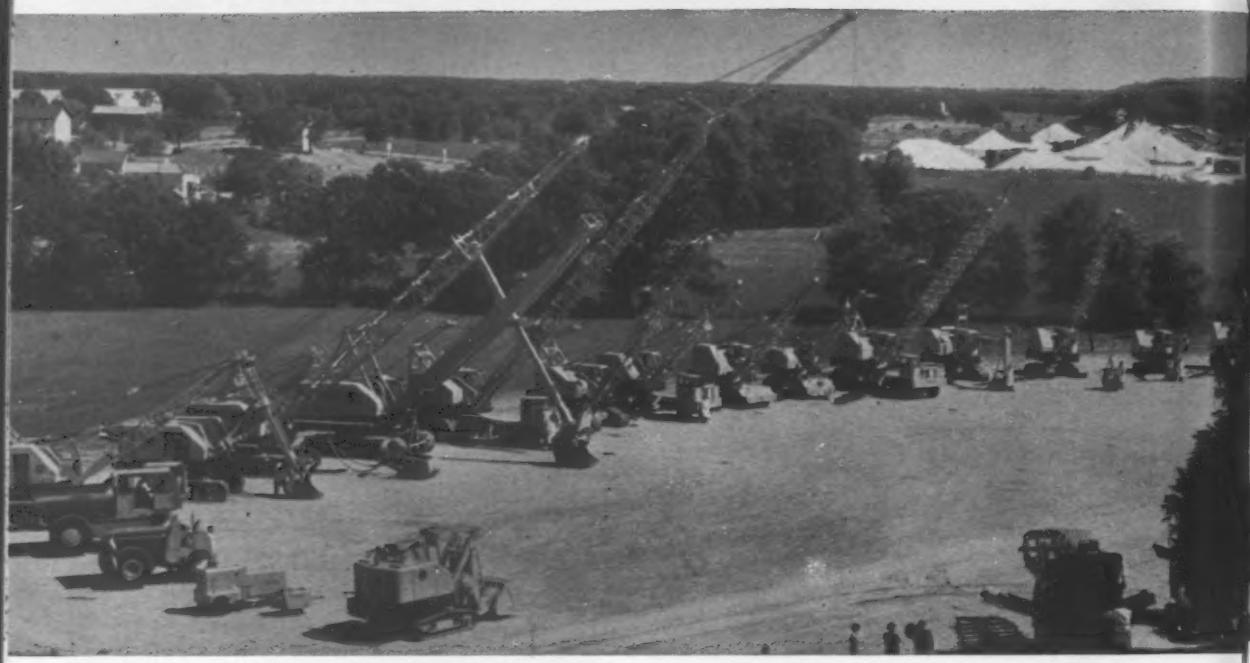

CRANES AND SHOVELS dominate show featuring heavy-duty construction equipment. Scene is Koehring's proving grounds.

Koehring Shows $1 Million In New Eq

NEWEST PAVING MACHINE at Koehring is a transverse finisher with two hydraulic, oscillating screeds. It finishes concrete pavements up to 30 ft wide.

Eleven major models of heavy construction and materials handling equipment—introduced during 1958 and worth $385,000, fob factory—formed the nucleus of the Koehring Company's million-dollar equipment show last week at its proving grounds 30 miles west of Milwaukee.

New models included crawlers, truck and cruiser cranes, a trencher, shovel-loader, dump truck, fork-lift and concrete finisher.

The other 20 machines making up the equipment show included heavy-duty crawler cranes equipped as draglines, shovels, hoes and clamshells. Concrete pavers, a high-lift shovel, and mud jacks were also shown. All were built by three of the company's divisions: Koehring, Parsons and Kwik-Mix. Most of these machines were developed during the past 7 years, although four of the models have been in production since the late 1930's.

• **Five-day show**—About 4,500 people witnessed the five-day equipment show. The first day was a preview by about 3,500 company employees and their families. This was followed in succession by a press day, two days of equip-

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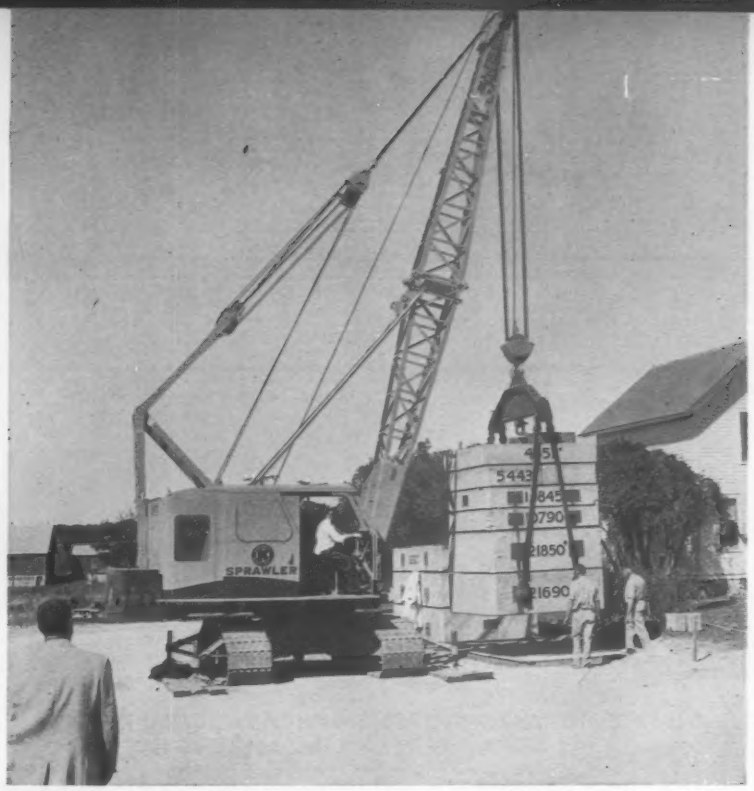


HERCULES –No. 545 crane lifts 4½ tons, 14% more than its weight.

ew Equipment

ment demonstration for company dealers and customers, and the final day devoted chiefly to equipment display and demonstrations for Wisconsin contractors.

• **Research and development**–In presenting the equipment show, Julien R. Steelman, president, declared that Koehring is backing up its faith in the future by improving and developing new models and by diversifying its interests in construction and materials handling. Research is such an important factor that about 3% of company sales is spent for new product engineering and development.

Mr. Steelman also noted that the acquisition of new types of manufacturing facilities during the past five years has brought two significant results: It has strengthened Koehring through product diversification and brought much valuable engineering talent into the organization. "In the field of highway construction for example," he said, "our excavators can make cuts or excavate embankment material; our Dumptors can haul it; our Kompactors and rollers can compact it; our trenching machines can handle the drainage work; and our now complete paving train can construct the concrete pavement."

• **Optimistic signs**–One reason for Koehring's optimistic outlook is that sales and new orders for its construction and industrial machinery during the second and third quarters of 1958 have experienced the first real upturn since July of last year.

In view of these increased sales, and other important basic factors, management feels that a reversal of the downtrend is in progress. And it expects the recent pick-up in demand for construction machinery and equipment to continue at least through the first half of fiscal 1959, which begins on December 1 of this year.

About 75% of the company's sales are construction machinery. Cranes, power shovels and trenchers account for 44% of total sales; concrete batching plants, mixers and pavers, 19%; compactors and rollers, 11%; and off-road haulage equipment, 5%.

• **New 1958 models**–Pound-for-pound, Koehring's Model 545 crawler crane, the "Sprawler," is one of the most powerful in its class. Introduced this past summer (ENR, June 12, 1958, p.84) the 79,000 lb rig can lift 45 tons–14% more than its own weight–at 12 ft radius, with outriggers and 30 tons without its pivoting outriggers. This machine combines high lifting capacity with great mobility. Sale price fob factory is $51,500.

• **Model 205 Skooper**–This crawler mounted, swivel-based, high-capacity loader, with a 1⅞ to 2¼ cu yd bucket, is expected to make a sizeable dent in the $150 million annual front-end loader market. With its ability to revolve a full 360 deg on its turntable, and a 7 ft independent crawling action, the machine can virtually stand still on its tracks during loading operations. Ten of the machines were tested on different types of jobs throughout the country this summer. Powered by a 70 hp diesel engine, the $29,730 machine can load 400 tons of material per hour.

• **10 cu yd Dumptor**–Designed and engineered for heavy-duty earth or rock hauling, Koehring's new Model 100 Dumptor is one-third larger than the Model 60 Dumptor which was developed nearly 20 years ago. It has a 30,000-lb payload capacity and hauls 8 cu yd struck or 10 cu yd heaped at speeds up to 20 mph. It features a pivoting operator's seat with two sets of controls allowing the operator to face either direction of travel. The machine has torque converter drive, power steering and either instantaneous gravity dumping or controlled gravity dumping by means of hydraulic cylinder snub-

Schramm Portable 125 cfm compressor powers two pneumatic tools preparing concrete curbing and gutter forms on ½ million dollar housing development project. Compressors produce full rated air—increase workers' efficiency.

TENNESSEE CONTRACTOR PRAISES SCHRAMM COMPRESSOR:

Delivers more air at less cost

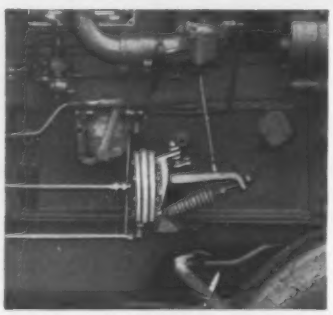
Schramm Model 125 piston type air compressors use from 15% to 50% less fuel than competitive air compressors. Yet they deliver more power, producing a full 125 cfm of air—not just a fraction of it. A Tennessee contractor reports that Schramm Compressors save him money because his men can do more work—more efficiently.

Model 125 either Pneumadiesel or Pneumapower (gasoline engine driven) is a self-contained, enbloc unit. Six cylinder block is divided three for engine, three for air. No clutch, belts, gears, chains or other forms of power transmission to go wrong. It's the lightest, most compact 125 cfm compressor built—and costs the least to buy and maintain.

We'll be glad to send you complete information on Schramm Pneumadiesel or Pneumapower. Write today for Catalog 5801—P125.

See the Yellow Pages for Sales, Service and Rental of Schramm Air Compressors.

Two wheel spring mounting with tool boxes permits high speed towing and carrying tools and equipment to the job. Four wheel and skid mountings are also available.



Automatic air control is a feature of Schramm Portable Compressors. The patented Schramm Pneumastat controls speed of each unit without operator's manipulation. Engine operates from idle to full rated speed according to air demand.

Schramm, Inc.

MANUFACTURERS OF AIR COMPRESSORS

620 North Garfield Ave. • West Chester, Pa.

bers. It is powered by a 168 bhp diesel engine, and has a turning radius of 24 ft 6 in. in either direction.

• **Three cranes**—Three cranes in the equipment show, developed during 1958 include a $44,000 Model 305 cruiser crane, a $47,000 truck crane Model 330; and a Model 435 truck crane with a selling price, fob factory, of $61,370.

The 305 cruiser crane has torque convertor drive providing a top speed of 18 mph, and it is designed for one-man operation. It can lift 25 tons at 12 ft radius, and mount a 100 ft boom with a 30 ft jib. Each wheel has air brakes.

The 330 truck crane lifts 30 tons at 12 ft, and also can handle a 100 ft main boom plus 15 to 30 ft jib boom. It was designed to fill the gap which existed between the company's 25 ton and 35 ton cranes.

The heavy-duty 435 truck crane picks up 35 tons on a 15 ft radius and mounts a maximum length main boom of 120 ft plus 15 to 30 ft of jib. The four-axle rig has a working weight of 86,000 lb; can be stripped to about 60,000 lb.

• **Trenching machine**—Newest addition to the Parsons line of trenchers is the $7,500 model 77 trenchliner. It digs a trench 6 in. to 18 in. wide and to a maximum depth of 5 ft. The ladder-type crawler mounted machine has a top traveling speed forward of 2¼ mph and ¾ mph in reverse. It fills the need of a trenching machine to dig trenches for utility service lines.

• **Transverse finisher**—A newcomer to Koehring's line of concrete highway paving equipment, developed during 1958, is a $14,875 transverse finisher. Designed for one-man operation, it has two oscillating screeds, hydraulically controlled. The machine has three traction speeds for finishing and one high-speed for traveling on the road forms. For transportation between jobs it is equipped with rubber tired transport wheels that lower and raise hydraulically. The machine can finish concrete slabs up to 30 ft wide.

• **Other 1958 models**—Among the other equipment developed this year were: a four-wheel drive high-lift fork truck, developed by the Kwik-Mix Division of Koehring. It can lift a 4,000 lb load 22¼ ft, has a top speed of 25 mph between jobs, is powered by a 70 hp gasoline engine and has torque converter automatic transmission. A similar machine, the Model R-18 Moto-bug for materials handling can lift a 1,500 lb load to a height of 7½ ft. This fork-lift machine has all welded construction.

(*New Products continued page* 53)

Cut Costs 3-Ways with NEW Compression Joints on Longer, Stronger Clay Pipe

Down go labor, handling and installation costs when you install Clay Pipe with the new research-developed factory-made compression joints! No longer is it necessary to buy and prepare jointing materials. No collaring, mortaring or hot-pouring . . . yet joints seal in seconds. And with new longer lengths there is less pipe to handle . . . fewer joints to make. Installation is faster, easier . . . with a minimum crew. Install the longest-lasting material ever developed for sanitary and waste installations . . . Clay Pipe with *new* compression joints—the only pipe with *all* the features you can trust.

Write your nearest NCPMI office for full details.

Vitrified **CLAY PIPE** *Never Wears Out*

NATIONAL CLAY PIPE MANUFACTURERS, INC. 1820 N Street, N. W., Washington 6, D. C.
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Pans do 1-mile hauling stretch in 6 minutes, round trip . . .

GULF MAKES THINGS

Malcolm and Benjamin Blankenship of Charlotte, North Carolina, set an almost unbelievable pace in earth-moving on a recent job, with Gulf fuels and lubricants in their power equipment. And they can tell you—Gulf makes things run better.

The job? Clearing, grading, drainage and bridge building on a 4.6 mile section of U.S. Route 29, from the Catawba River to the Charlotte bypass. On a tight schedule, they moved 1,132,000 cubic yards of material.

The pace? Take pan trip time. At one location, only 6 minutes, *round trip*, over a 1 mile hauling stretch. Pans averaged 20 miles an hour. Excavation volume? Over 10,000 cubic yards a day.

How did they do it? They used modern equipment, serviced it properly, and depended on Gulf fuels and lubricants for smooth dependable operation. As Ben Blankenship says: "Earth moving pans do a bigger day's work with good fuel and lubrication."

Gulf teams up with the Blankenships. Left to right: W. C. Ritchie, Gulf Sales Representative; Roy G. Burkhalter, Sr., Gulf Sales Representative; Banks Massey, General Superintendent, Blankenship Brothers; Benjamin M. Blankenship, Partner; Mike Blankenship (son of Ben) on machine.

Ready to roll—on Gulf quality fuels and lubricants. Blankenship equipment on this job included 9 pans, 3 sheepfoot rollers, 3 motor graders, 3 dozers, 3 push cats, and 1 back hoe. In fair weather or foul, if the State Engineer said, "It's a work day"—Blankenship equipment rolled continuously!

RUN BETTER!

Senior partner Malcolm Blankenship adds: "We credit Gulf with helping to keep our equipment moving at relatively high speeds—in all kinds of weather—and getting maximum output from every machine."

How about *your* operation? Gulf can make things run better on your jobs, too. Ask a Gulf Sales Engineer. Just call your nearest Gulf office. Meanwhile, mail coupon for revised edition of "Contractors' Guide," the lubrication and maintenance manual for heavy equipment.

GULF

GULF OIL CORPORATION
Dept. DM, Gulf Bldg., Pittsburgh 30, Pa.

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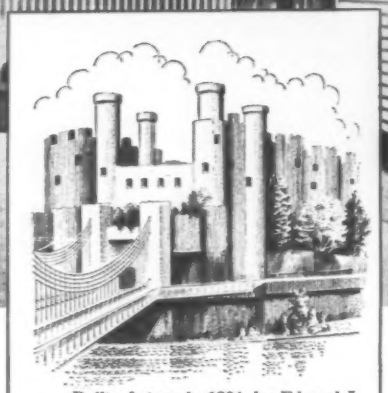


Built of stone in 1284, by Edward I, Conway Castle, Caernarvonshire, Wales, still defies the ravages of weather and time.

For Permanence, Economy and Decorative Effect

Johns-Manville Corrugated Transite® wears like stone

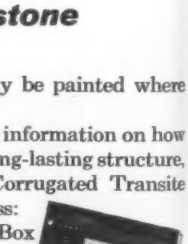
Corrugated Transite sheets, made of asbestos fibre and cement, formed under great pressure, possess unusual strength, rigidity and durability.

Like the famous old stone castles, thousands of original installations of Corrugated Transite are still giving service and protection, under conditions which destroy other forms of walls and roofing.

You save money on maintenance with this asbestos building sheet. It can't rot, can't rust, can't burn. It has high resistance to acids, to gaseous fumes, to severe temperatures, to vermin and insects.

Simple and pleasing shadow-line effects in decorative design are achieved by installing Corrugated Transite vertically or horizontally. Sheets are of a light gray color. Design possibilities can be expanded by combining Corrugated Transite with other types of building materials. Transite may be painted where desired.

For additional information on how you can have a long-lasting structure, write for new Corrugated Transite brochure. Address: Johns-Manville, Box 158, New York 16, N. Y. In Canada: 565 Lakeshore Road East, Port Credit, Ontario.



JOHNS-MANVILLE

JOHNS-MANVILLE PRODUCTS

Jacketed "Y" Valves Offer Two-Fold Advantages

Jacketed "Y" valves have been added to the Parks-Cramer line of jacketed piping and fittings. These 1¼ to 8 in. dia. valves provide the low flow resistance characteristic of gate or plug valves, with the convenience and control of a globe valve, according to the manufacturer.

Valves are fully jacketed, suited for steam, hot oil or any other type of heating medium. Standard material is semi-steel, but they also are available in ductile iron, bronze, steel and stainless steel. PARKS-CRAMER CO., FITCHBURG 28, MASS.

. . . New Products Briefs

• **Masonry coating**—A silicon base water repellent for concrete surfaces is offered under the name "Nacor." The manufacturer says the material achieves maximum penetration of masonry surfaces within an hour after application. NATIONAL ASPHALT CORP., CLEVELAND 15, OHIO.

• **Heat pump**—Indoor and outdoor sections of a new horizontal heat pump measure roughly 2 ft x 2 ft x 4 ft and may be installed in a variety of locations as a single unit or separated with an optional discharge hood. New coil design and control mechanisms reportedly give large cooling and heating capacities. LENNOX INDUSTRIES, INC., MARSHALLTOWN, IOWA.

• **Abrasive blade**—Concrete sawing gets a break with a new abrasive blade, the C-1000, designed for wet or dry cutting. Silicon carbide crystals in a tough bonding agent gives long life and large production. CHAMPION MANUFACTURING CO., 2028 WASHINGTON AVE., ST. LOUIS 3, MO.

• **Dustless air hammer**—A new "inhaling" hammer, the Thor No. 15-DL, sucks in drilling dust through the hollow drilling steel. Dust moves out of ports in the head, back through hose to a special dust-extracting tank. THOR POWER TOOL CO., PRUDENTIAL PLAZA, CHICAGO 1, ILL.

• **Rolling scaffold**—Designed to roll along the top of a tilt-up wall, the Tilt-Up Rolling Scaffold is said to materially reduce the cost of finishing and painting tilt-up panels. The basic unit provides a work area 14 ft high and 7 or 10 ft wide. For walls over 20 ft high, a 6 ft extension is available. SUPERIOR SCAFFOLD CO., 5624 BANKFIELD AVE., CULVER CITY, CALIF.

Keep water IN—
Keep maintenance DOWN!

Don't take chances with that costly swimming pool.

If it is made of concrete, it is porous—if it is porous, thousands of gallons of water will enter and finally deteriorate the masonry—causing it to crack.

Make the FIRST COST the LAST COST!

Ask your contractor to make sure it is watertight by using THOROSEAL to seal the surface. THOROSEAL is available in many attractive colors.

Thoroseal is not just a coating for masonry, it is a filling sealer that becomes a part of the masonry and protects it from deterioration.

"How to do it" GET OUR 16 PAGE BROCHURE

STANDARD DRY WALL PRODUCTS, INC.
NEW EAGLE, PENNA. CENTERVILLE, IND.

EDWARD J. CLEARY, chief engineer and executive director of the Ohio River Valley Water Sanitation Commission, can look back 10 years at an admirable record. He can also see completion of his task ahead.

Cleanup Man on the Ohio River

When the Ohio River Valley Water Sanitation Commission was formed 10 years ago to clean up America's dirtiest river valley, a great many persons were openly skeptical. It was improbable that eight states could remain together long enough on a job that required forthright action.

The skeptics were soon confounded. Today, they are even more confounded as ORSANCO, the phonetic abbreviation given the agency, looks toward completion of one of its two big jobs and swings over to devote prime attention to the other.

In 1948, when the commission was formed, municipal sewage treatment plants existed or were under construction for only 1% of the sewered population discharging to the mainstem Ohio. Now, facilities are in operation or under way to serve 92%.

It is the industrial-waste half of the picture that is now the big challenge. Only 24% of the industries discharging directly to the Ohio River in 1948 provided some form of control. Now, 76% are in this category.

What does a look at the Ohio River show for 10 years of cleanup? Plenty particularly if you go along with the view that esthetic considerations weigh heavily in the conduct of pollution control. The people who pay for treatment projects want a river that doesn't smell, flows clearly, has no floating scum or solids, tastes good when treated and is suitable for swimming, fishing and other recreation.

The Ohio River today largely satisfies those basic objectives. Judged in this light the ORSANCO crusade has been eminently successful. Eight states have prodded 179 of their municipalities (pop. 3.4 million) into completing or getting under way some $250 million of treatment plants. Another 20 communities have completed final designs. Only 33 towns, whose populations constitute less than 3% of the total, have not yet reached the stage where early construction can be expected.

Observers from all over the world consider this mass action an all-time marvel in pollution control history. Those who dig a little deeper are often surprised to find out just how ORSANCO did it.

• **Eight states, one aim**—The Ohio River Valley Water Sanitation Compact was more than a paper dream. It gave substance to a dream that envisioned the possibilities of joint action by eight states to do a job that no one of them could do alone.

The record shows that the eight states (Illinois, Indiana, Kentucky, Ohio, Pennsylvania, New York, Virginia and West Virginia) who pledged their united support in a regional crusade for water pollution control are redeeming that pledge in full measure.

ORSANCO's indispensable role has been—and is—that of an innovator and coordinator. This function is personified in Edward J. Cleary, executive director and chief engineer of the commission's staff since its organization in 1948.

Mr. Cleary is a man of boundless enthusiasm and energy. He went at his job in the Ohio Basin with the dedication of a missionary. He found the commissioners of ORSANCO, then and since, to be dedicated men who fully recognize that the destiny of the Ohio Valley is linked with the safeguarding of its water resources. They are also practical men who know they are dealing with a situation of such scope and magnitude that orthodox approaches will not satisfy the needs.

They lost no time in harnessing the interest, resources and talents among the industrial corporations in the valley. There are now six so-called "industry action committees:" chemical, coal, metal-finishing, oil refining, pulp and paper, and steel. Two other advisory groups are the aquatic life and water users committees.

As more and more municipalities and industries installed treatment facilities, ORSANCO commissioners and staff developed a confidence that they were able to transmit to the public at large. A bandwagon effect was nurtured.

All the appeals for cleanup were used. Protection of potable water supplies is often advanced as a chief

justification for waste treatment plant construction. But the fact is, in Chief Engineer Cleary's view, that there are many other equally solid reasons for safeguarding water quality. Maintaining water quality suitable for industrial purposes is a case in point; industrial water use on the Ohio River today totals 13 billion gallons daily—many times more than municipal demands. Without overlooking the dollar sign in the evaluation of pollution control, he points out that there are many intangible values that defy measurement. In this connection he cites a parallel between investments in parks and clean streams.

• **Industrial waste treatment**—Although the municipal treatment plant program in the Ohio Valley received top priority during the first few years, ORSANCO didn't neglect industrial wastes. However, the problem was, and still is, complicated by the many unknowns in the industrial realm. Even the current accreditations of "adequate" industrial treatment are based only on standards for the "knowns;" some of the present treaters will undoubtedly have to install additional facilities as standards or limits for more pollutants are set.

To its credit, ORSANCO avoided the pitfall that has snared many a regulatory agency. It did not start right in by setting a standard for every pollutant under the sun—and then discover how unreasonable many were as more was found out about each pollutant.

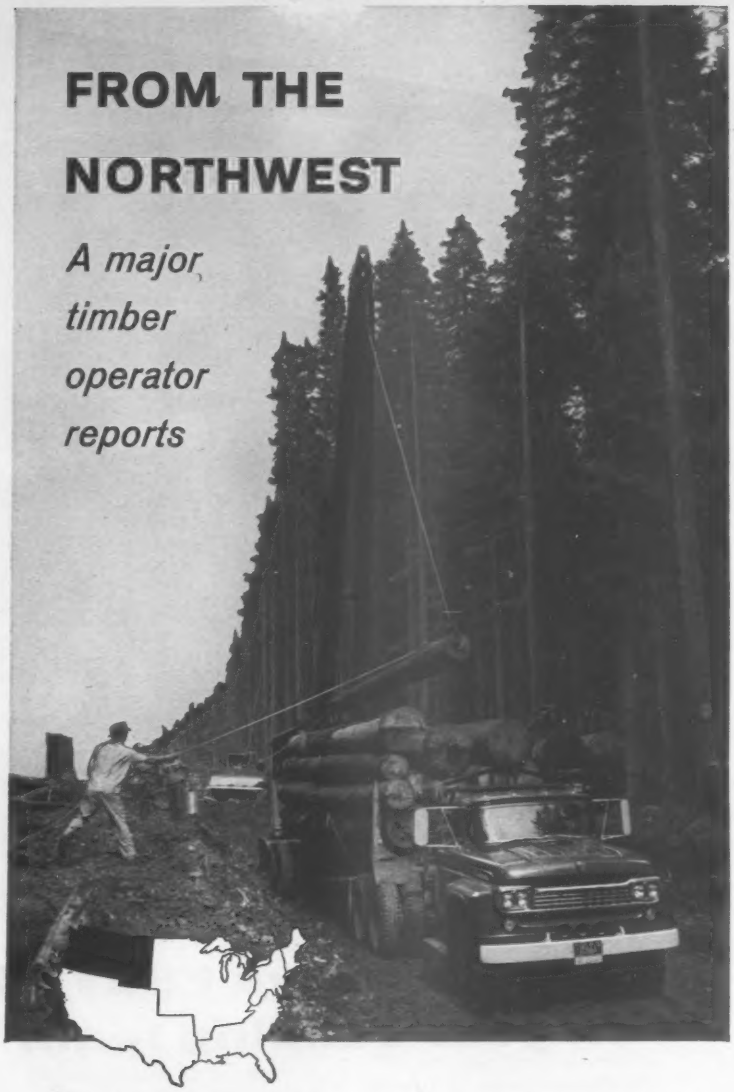
About two years after it was formed, following the completion of public hearings required in connection with control of municipal sewage, ORSANCO explored procedures for control of industrial wastes. It became apparent there were differing philosophies among the eight states (basically between the "early" regulation setters and the "after investigation" group).

During these discussion years in the early fifties, the industry advisory groups were formed. The idea, as expressed by ORSANCO Director Cleary, was for the committees to crystallize the industry viewpoints, become familiar with ORSANCO's viewpoints and obligations, and from this point on produce some action resulting in pollution abatement.

In 1953 an "Industrial Waste Control Policy and Procedure" was proposed. After two more years of discussion, it was adopted by the commission in April, 1955. The go-slow-but-sure adherents won out. ORSANCO adopted a policy of "tailored" control

FROM THE NORTHWEST

A major timber operator reports



Steve Wilson's company hauls logs from mountainous Oregon timber stands—over crude roads with grades up to 18%.

Mr. Wilson has 43 Ford trucks and tractors that haul nearly 300,000 board feet of logs and rough lumber a day.

"I can't think of a tougher job for a truck than my operation," says Steve Wilson. "I need trucks that can take punishment and *stay* on the job. If a load of logs isn't delivered on schedule, I can lose plenty."

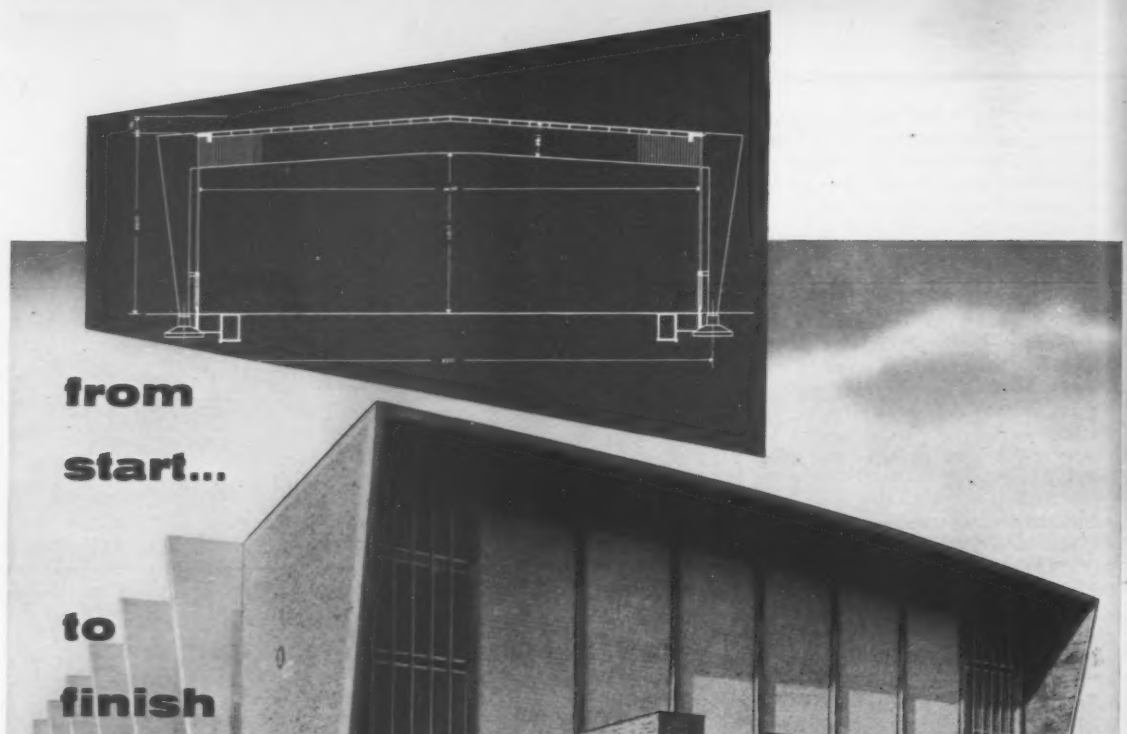
The tractor in the picture is a 1958 Ford T-850.

It is powered by a 534-cubic inch V-8 engine. Rear axle ratio is 6.69 to 1, wheelbase is 192 inches. It is equipped with a 5-speed main transmission and a 4-speed auxiliary, and grosses 72-76,000 pounds.

"Diesels used to walk right around us, but today it's just the opposite. This big Ford climbs a 10% grade loaded at 11 miles an hour, compared to 6 mph for our previous truck."

S. O. Wilson

President
Steve Wilson Company



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Freyssinet—famous the world over for high standards, design economy, speed of construction

Ex-Editor Ed Cleary brings the engineering approach to pollution abatement.

requirements for each industrial plant discharging directly into interstate waters in the Ohio Valley. These requirements were to be based on safeguarding quality for the uses the river was intended to serve. It was also resolved that optimum use would be made of the river's capacity for self-purification.

The "tailored" policy is simple and logical; implementing it takes time, since it involves engineering evaluation. Meantime, important steps were taken to develop basic data on the basis of which conclusions could be reached.

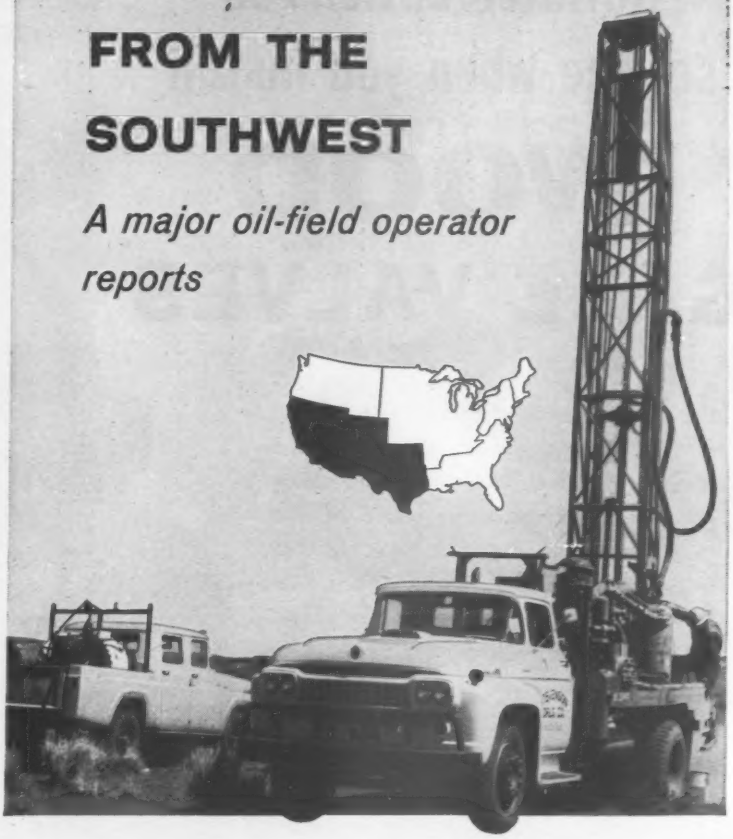
Beginning seven years ago, ORSANCO pioneered in the establishment of a monitor network of 44 sampling stations to check the quality of water on a systematic and continuous basis. More recently ORSANCO has been exploring the possibilities of automatic analysis and transmission of river-quality conditions through the development of "robot monitors." In this connection, Director Cleary told the commission last month:

"One might reflect that purveyors of river water are probably the only 'manufacturers' who are expected to take out a raw material that varies from day to day and yet be prepared to turn out a uniform product regardless of what they must start with. Therefore, any system that will permit advance information on changes—or better yet the anticipated rate of change—in quality of the raw material could mark one of the most useful advances in the art of water-supply management. The commission should not be unaware it is a pioneer in promoting this concept."

Promoting new concepts has come to be "old stuff" for ORSANCO over the years. The agency has come forth with good ideas, and it has promoted

FROM THE SOUTHWEST

A major oil-field operator reports



This '58 Ford F-850 runs all day . . . but hardly moves at all.

It belongs to the Stevenson Drilling Company of Houston, Texas. The truck goes only a few miles a day but its V-8 engine runs all day long—powering (transmission PTO) a drill that's searching for oil. The combination air-water drill makes 100-ft. deep "shot holes." The oil company geophysicists detonate dynamite in these holes for seismograph recordings that reveal the location of new oil deposits.

"We are really impressed with the way these new Ford Super Duty V-8's are engineered," says W. M. Stevenson. "We normally drill on propane, through a truck's carburetor throat, but the fuel costs of our Super Duty V-8 turned out to be so reasonable that we didn't need to switch."

The Super Duty V-8 power plant in the Stevenson Company's F-850 displaces 401 cubic inches. It has a 5-speed transmission and a two-speed rear axle ratio of 6.50/8.87 to 1. Wheelbase is 175 inches, gross weight 23,000 lb.

"We have used Fords since 1946. We like the availability of Ford replacement parts, their low cost and the excellent Ford service. I plan on buying Ford trucks 100% in the future."

W. M. Stevenson

President
Stevenson Drilling Company

No interruptions in service when you install

WOOD GATE VALVES

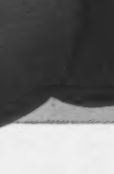
Because of their inaccessibility underground, repairs to gate valves are always time-consuming, expensive, and a source of annoyance. And interruptions in service while repairs go on are hazardous for the community.

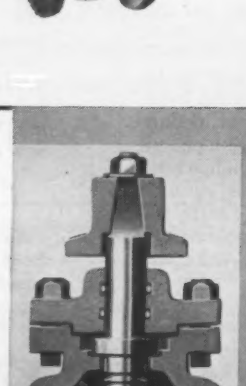
For these reasons, R. D. Wood Gate Valves are designed to function for generations no matter what the conditions. They are rugged in construction, fully bronze mounted, and tested to 300 lb. hydrostatic pressure. Designed for working pressures conforming to AWWA specifications.

Available with mechanical joint or flange-type pipe connection

SIMPLE IN DESIGN

Only three moving parts—a spreader and two discs which are free to revolve their complete circumference while being raised or lowered. Gates are lifted clear of valve seats, providing unobstructed flow.





R. D. Wood Gate Valves also available with O-Ring Stuffing Box seal when specified.

R. D. WOOD COMPANY

Public Ledger Building, Independence Square, Philadelphia 5, Pa.

Manufacturers of Mathews Hydrants and "Sand-Spun" Pipe (centrifugally cast in sand molds)

"Mr. Cleary is a man who puts a pad, pencil and paper on his night table . . ."

them effectively. Its public relations effort has been considerable.

• **The man behind the program**—Ed Cleary left a position as executive editor of ENGINEERING NEWS-RECORD to accept the Ohio River challenge. But he didn't really leave the publishing business; booklets and pamphlets and reports issue regularly from ORSANCO's Cincinnati office, all done in a professional manner.

His speech making has at least kept pace with his publications through the years. The speaking assignments range from the informal after-dinner type to a formal University of Cincinnati lecture series. He has ranged as far as Yugoslavia, in 1954, to conduct a seminar on governmental control of stream pollution, sponsored by World Health Organization and the Rockefeller Foundation.

Mr. Cleary consistently brings the engineering approach to the problems of pollution abatement. Sanitary engineering studied at Rutgers University (B.S. in 1929, M.S. in 1933, C.E. in 1935) has stood him in good stead, and voracious reader that he is, his self-education process is never-ending.

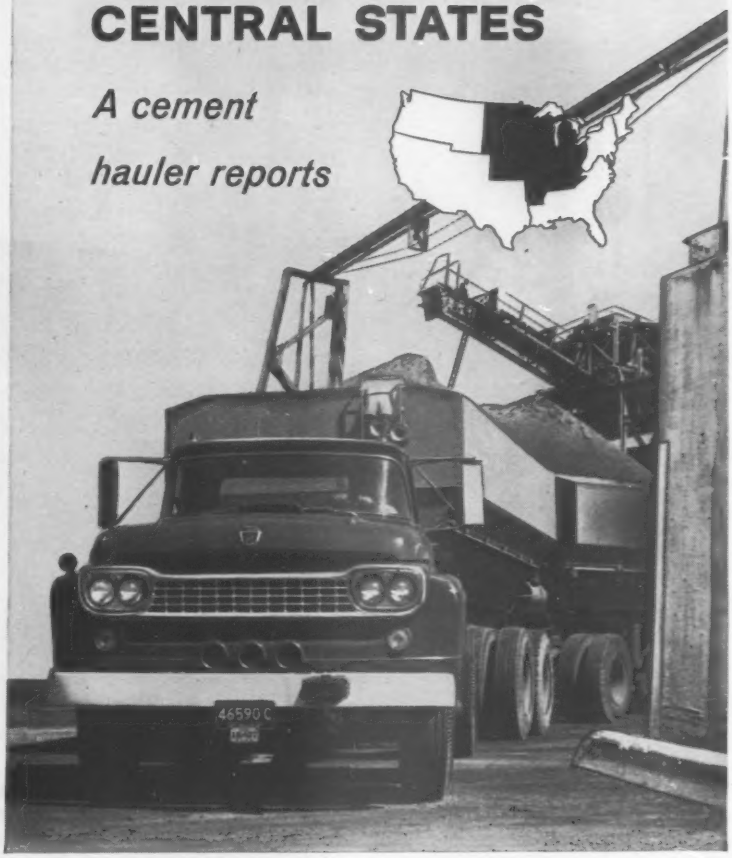
Intensely involved in everything he tackles—be it an ORSANCO problem or an exercise at the organ—Mr. Cleary is a man who puts a pad and pencil on his night table before retiring, lest any idea of his waking moments before dawn be lost.

This story of ORSANCO over the last 10 years is the story of Ed Cleary, for the two are one. Indeed, even Mrs. Cleary complains good-naturedly that she can no longer differentiate between them.

Ed Cleary confesses there are times when he feels exhausted. But he sees no exhaustion of challenging opportuni-

FROM THE CENTRAL STATES

A cement hauler reports



Carl Harrison, Inc., is a limited common carrier of bulk cement operating out of Dearborn, Michigan. The Ford F-1100 shown above is the biggest of the firm's six Ford trucks.

This F-1100 grosses 98-100,000 lb. pulling doubles. Payload is 64,000 lb. (170 barrels of cement). Company President Carl Harrison makes the point that the low curb weight of Ford trucks allows him to carry bigger payloads. "The curb weight of this Ford tractor is almost half a ton less than another make we have used on this job."

Carl Harrison's shrewd appreciation of efficient, economical equipment is further evidenced by the fact that his bulk cement semi-trailers are custom-built to his own design.

Additional specifications of this F-1100: 534-cu. in. Super Duty V-8, 5-speed transmission, 2-speed rear axle, 144-in. wheelbase.

"And as far as power is concerned, this big Ford has really got it. She saves time on every trip, time that means money to us."

Carl Harrison

President
Carl Harrison, Inc.

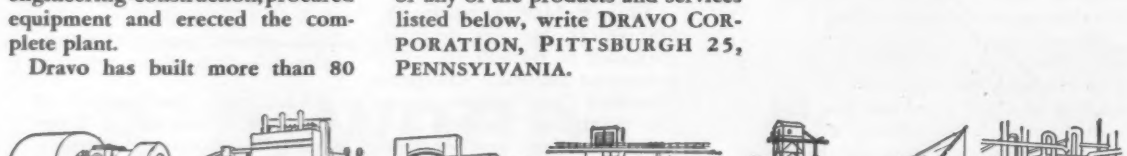
Five "turn-key" boiler plants for FORD

Five new Ford Motor Company factories will have Dravo-built steam generating and air compressor plants similar to this one in Sterling Township near Detroit. Three are in operation, the fourth and fifth are under way. First of these turn-key projects was built in 1955. Ford engineers specified design requirements . . . Dravo handled engineering-construction, procured equipment and erected the complete plant.

Dravo has built more than 80 power and steam generating plants for both industrial and central station use. The combination of pipe fabrication facilities and construction experience produces low cost plants that are economical to operate and maintain.

Your next construction project may benefit by making use of this teamwork. For information on this, or any of the products and services listed below, write DRAVO CORPORATION, PITTSBURGH 25, PENNSYLVANIA.

DRAVO
CORPORATION



Blast furnace blowers • boiler & power plants • bridge sub-structures • cab conditioners • docks & unloaders • dredging • fabricated piping

foundations • gantry & floating cranes • gas & oil pumping stations • locks and dams • ore & coal bridges • process equipment • pumphouses & intakes

river sand and gravel • sintering plants • slopes, shafts, tunnels • space heaters • steel grating • towboats, barges, river transportation

ties for the development of more effective ways to carry on what he calls "river-quality management." (He believes this term more properly describes what the sanitary engineer in water pollution control is attempting to do.)

He gets pretty excited about "robot-monitoring," an idea that he has been nurturing for almost 10 years since he first pondered the problem of how to manage the quality of a river system with 1,000 miles of main-stem, 20 major tributaries and the impact of waste discharge from thousands of industries and municipalities.

He recalls thinking, when he assumed his job, that the challenging aspects of the ORSANCO program would last about 10 years. He grins at that today, then bites down hard on his pipe with determination and looks ahead with his natural enthusiasm to his second 10 years with ORSANCO.

Careers

Business

James A. Jones, Jr., joined The Prescon Corp., manufacturer of prestressing steel, as structural engineer in the Corpus Christi, Tex., office.

Morris Schupack and **Charles C. Zollman** have combined to form **Schupack & Zollman** in Newtown Square, Pa., for the practice of civil engineering, specializing in precast and prestressed concrete. Mr. Schupack was formerly chief engineer and vice president of Preload Co., New York City.

Jack R. Miller and **William Kowalsky,** consulting engineers, have formed the **J. R. Miller Co.,** New York City, to serve the iron and steel industry.

Carroll L. Brown and **John J. Sleavin** have opened a consulting engineering office in Tacoma, Wash.

Arthur G. McKee & Co., engineering and construction firm for the petroleum and steel industries, has opened a new sales office in Houston.

Crosby W. Bean has been appointed southwestern division sales manager of Armco Drainage & Metal Products, Inc. With headquarters in Houston, he will be in charge of sales in Texas, Oklahoma, Arkansas, Louisiana, Mississippi and western Tennessee.

James B. Kunkler succeeds the late **A. C. Neff** as manager of Armco Steel Corp.'s central division in Ohio, West Virginia and Kentucky.

Public Works

Maurice Poulter is a new planning assistant for the City-County Planning and Zoning Commission, Louisville. He succeeds **James J. Tallon,** who resigned to become assistant to the director of urban renewal at Phoenix.

FROM NEW ENGLAND

A nationally operated dairy reports

"Milk and dairy products make highly concentrated loads," says Elnathan Mitchell, President of Mitchell Dairy. "We need a bigger, stronger tractor than usual for our gross of about 50,000 lb. We decided to try a new Ford Tilt."

Mitchell Dairy, an affiliate of The Borden Company, has headquarters in Bridgeport and serves almost the entire state of Connecticut. The dairy's Ford C-1000 Tilt is on the job seven days a week, hauling canned and bottled milk from Bridgeport to outlying distribution plants.

This big Ford operates both in heavy city traffic and on expressways. Comments of drivers: "She makes it really easy to handle trailers in tight areas". . . "There's practically no shifting once she gets up to cruising speed". . . "Outpulls any tractor in the fleet."

Mitchell's Ford C-1000 Tilt Cab tractor has a 477-cu. in. V-8, five-speed transmission, 6.71/9.13 to 1 two-speed rear axle ratio, 99-inch wheelbase.

"We bought this Ford Tilt Cab truck chiefly because of its maneuverability and its low curb weight—over 1,000 lb. lighter than competitive tractors. That means our legal payload can go better than 30,000 lb."

Elnathan Mitchell

President
The Mitchell Dairy Company

Want an easy-to-install drainage structure?

use Corrugated Metal

You don't need expensive handling or lifting equipment to install a Corrugated Metal Pipe Structure. The pipe comes in long lengths ready to lay, and since it is light and easy to handle, requires less time to install. For example, three men can properly install a 20′ length of Corrugated Metal Pipe in a matter of minutes. Corrugated Metal Drainage Products made from USS Galvanized Steel Culvert Sheets do not require "kid glove" handling. If dropped, they will not crack or spall. There are no losses due to breakage. Consequently, it is only necessary to order the lengths required to complete the job.

Write for our free booklet "USS Culvert Sheets" which tells you how to get the kind of service you can expect from Metal Drainage Structures made from USS Galvanized Steel Culvert Sheets. It's loaded with information about selection of correct structure sizes, preparing foundations and installation procedure. For your free copy, write to United States Steel Corporation, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

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United States Steel Corporation—Pittsburgh
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United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

Legal

Liability Limited

Damages for defective work fixed by contract

The liability of a contractor for defects in his work may be limited by contract.

Such a situation occurred on a construction project for the Greater Peoria Airport in Illinois.

M. Vander Heyden, doing business as Dyer Construction Co., was the general contractor. A subcontract was let to Armco Drainage and Metal Products, Inc., for furnishing and laying multiplate pipe. Because of alleged defects in Armco's work, the pipe had to be relaid and considerable backfill placed.

A lawsuit developed. The question before the court was the extent of Armco's liability. The court held that under the terms of the contract Armco was responsible for defects in the pipe and in its laying but not for consequential damages.[1]

The controlling clause was this:

"The company's (meaning Armco) liability hereunder shall be limited to the obligation to replace any work or material proven to have been defective in quality or workmanship at the time of completion or delivery or allow credit therefore at its option. In no event shall the company be liable for subsequential damages or claims other than as aforesaid."[1]

The court stated: "In construing the contract the court is of the opinion that Armco was obliged to furnish the pipe called for and obliged to erect the pipe. The contract contemplated more than the furnishing of the material. The condition above referred to is a responsibility limitation provision and is not limited to the quality and workmanship of the furnished article, but applies as well to the work of Armco in erecting such pipe on the established grade. It would appear to be arbitrary to hold that the words 'any work or material' should be restricted in its application to the furnished product and held inapplicable to the erection of the pipe when such erection is as much a part of the contract as the furnishing of the pipe. The counterclaim alleges that counterdefendant (Armco) negligently connected pipe to excessive length in the process of erection and alleges a negligent failure to remove plates in the process of erecting causing excessive extension of pipe to become filled with water during a heavy rainstorm, causing flotation and causing much of the back fill to be lost, all of which required a

FROM THE MIDDLE ATLANTIC STATES

A dump truck operator reports

"I operate all over New York State," says owner-operator Wendell Wilbur, "and loaded or empty my Ford can beat any dump on the job."

Mr. Wilbur's big 1958 Ford T-850 has a 10-cu. yd. dump body, is powered by a 477-cubic inch V-8, grosses 50,000 lb. It is equipped with 5-speed main transmission, 3-speed auxiliary, and has a 156-inch wheelbase.

"I'm in this truck all day long," says Mr. Wilbur, "and it's the smoothest riding tenwheeler I've ever driven. And talk about handling!—with power steering my rig handles easier than a lot of pickups.

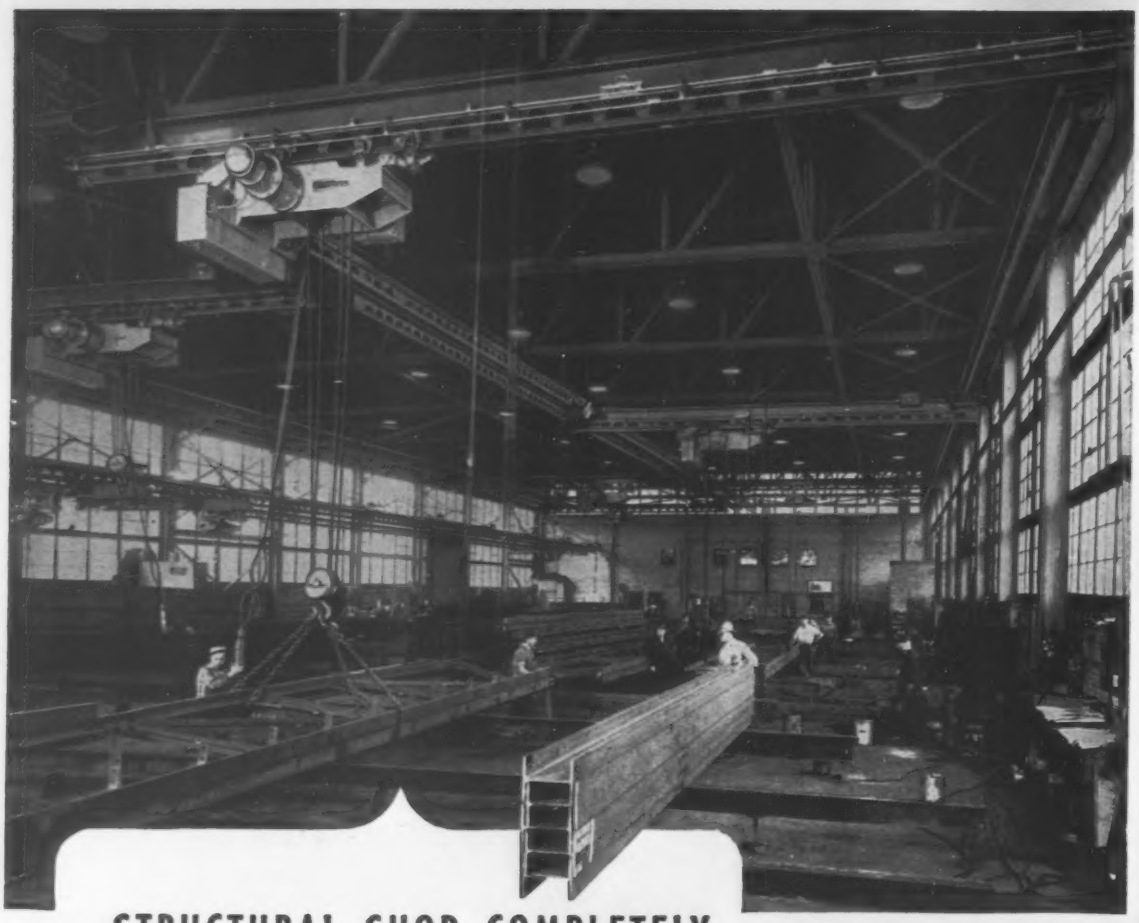
"This Ford's curb weight is almost 4,000 pounds less than other comparable trucks. That means more money-making payload for me."

Mr. Wilbur has been a truck user for more than twenty-five years, and he's been a Ford user just as long.

"My Ford T-850 has real power—on the hills I can pull away from any truck around—I even leave big diesels behind."

Wendell Wilbur

Owner-Operator
Ellenville, N.Y.



STRUCTURAL SHOP COMPLETELY COVERED WITH TRANSFER CRANES

... Eliminate Lost Time Waiting for Crane Service

... Enable Direct Fast Delivery Between Any Points in Shop

... Hoist Carriers Can Be Used Together or Separately in Accordance With Load Requirements

In this area are six motor driven 5 ton, 38′ 0″ span transfer cranes on two runways. Any crane on one runway may be interlocked with any crane on the other runway, permitting a hoist carrier to transfer from one to the other. Not only does this permit direct delivery of loads between any two points in the shop, it allows two hoist carriers on one crane to support both ends of a long truss when desired.

Along the wall at left three two ton, 12′ 0″ span hand propelled cranes with electric hoists handle beams in and out of a punching machine and spacing table.

A BIG factor in the rapid growth of Standard Iron & Steel Works, Limited, Toronto, Canada, is acknowledged to be their wide use of Cleveland Tramrail transfer cranes. This equipment makes possible a highly efficient operation, greatly speeds production and cuts costs.

Cleveland Tramrail equipment has been used at Standard Iron from their early days in the fabricating business. As the company has expanded, more Tramrail has been added. Today Standard Iron is one of the foremost companies in the Toronto area in the design, fabrication and erection of structural steel for buildings and bridges.

For live, aggressive companies like Standard Iron & Steel Works, Limited, Cleveland Tramrail has much to offer. It provides real help in the struggle with rapidly rising production costs. A nearby sales engineer will gladly give you details.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 3117 E. 290 ST. • WICKLIFFE, OHIO

relaying of said pipe and replacing of said back fill. It is the opinion of the court that the parties contracted to limit Armco's liability, both in contract and in tort, to the replacement of the furnished product or the installation thereof where either the work or material in connection with either the furnished product or the installation thereof was defective in quality or workmanship. The parties denoted an exclusive remedy in the event either defective work or material is involved in either the furnished product or the erection thereof.

"The contract herein and the conditions which are a part of the contract do not violate any public policy. It is basic that parties may contract for an exclusive remedy which shall be binding on them. The parties can by express agreement limit their rights, duties and obligations under the contract and this has been done in this case. There is nothing in this case to suggest that the parties were not dealing at arms length and upon equal footing.

"The Court has considered the Illinois cases cited in counterclaimant's brief. These cases hold that the intention to exonerate from negligence must be expressed in clear and unequivocal terms. However, the cases do not hold that in order for the intention to be unequivocal it is necessary that the word negligence be used. There are a number of cases where the language of the agreement was so broad as to indicate the intention of the parties that it should include negligence though the word negligence was not used. Russell for Use of Continental Casualty Co. v. Shell Oil Co., 339 Ill. App. 168, 89 N.E. 2d 415. See also, Chicago & N. W. R. Co. v. Chicago Packaged Fuel Co., 7 Cir., 183 F. 2d 630; 175 A.L.R. 10, at page 30.

"Another condition of this contract provides that 'in no event shall the contractor be liable for consequential damages.' All of the alleged damages set forth in the counterclaim are consequential in nature. This is further reason to dismiss the counterclaim."

(1) United States v. Vander Heyden, 158 F. Supp. 930, U. S. District Court, Jan. 23, 1958.

These summaries of court decisions are prepared by I. Vernon Werbin, Esq., New York attorney and licensed professional engineer, who is author of the following books published by McGraw-Hill Book Company, Inc.: *Legal Phases of Construction Contracts; Legal Guide for Contractors, Architects and Engineers;* and *Legal Cases for Contractors, Architects and Engineers.*

FROM THE SOUTHEAST

An over-the-road hauler reports

Estes Express Lines, of Richmond, Va., owns a 1958 Ford C-1000 Extra Heavy Duty Tilt Cab model. This rig is on the job 20 hours a day, piling up ten thousand miles a month.

Robey W. Estes, Vice President and General Manager, calls the performance he's getting from his new Ford Tilt "outstanding."

"The economy of Ford's 477-cubic inch V-8 compares very well with the 450-cubic inch sixes in our fleet," he adds. "The Ford performs better and doesn't use any more gas. We get over 5 miles per gallon, which is pretty good for our gross and our kind of hauling. The Ford also has a lot more power and speed. As one of the drivers told me—that Ford gets down the road mighty easy."

Estes Express's big Ford is a 1958 C-1000 tractor, with a 477-cubic inch V-8 engine. It has a 99-inch wheelbase, a five-speed transmission and a two-speed rear axle ratio of 6.14/8.36 to 1. Gross weight runs from 52 to 56,800 lb.

"Ford's Tilt Cab design gives us as much as 1800 pounds more payload than we could get with a conventional tractor. Drivers prefer the Tilt because of its comfort and maneuverability."

Robey W Estes

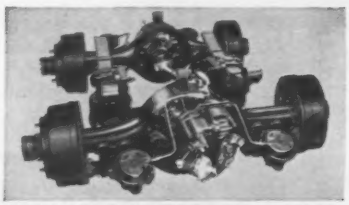
Vice President and General Manager
Estes Express Lines

Whatever the job . . . wherever you do it!

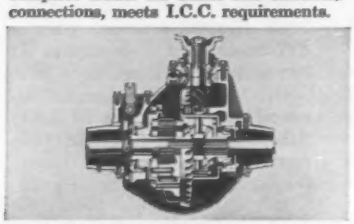
There's more to look for in Ford's extra heavies for '59

Ford Extra Heavies have proved themselves on every kind of job—you can count on them for *dependability* and *durability*. And in '59, you get high performance at low Ford prices for brand-new reasons! New faster rear axle ratios, new higher capacity axles, and other important options make big-truck operation still thriftier in '59 when you go *Ford*-ward. Send coupon for full information!

NEW Tractor Equipment Package provides complete trailer air brake and electrical connections, meets I.C.C. requirements.



NEW Ford Tilt Cab Tandems are available with three tandem-axle capacities: 28, 34, and 38,000 lb. Front axles to 15,000 lb.



NEW Faster Axle Ratios team up with Super Duty V-8's for greater gas economy and reduced engine wear. For example, 5.43/7.39 to 1 available in 1100 Series.

NEW 2-Shoe Brake (parking) is standard for '59 on all Ford Extra Heavies. Has 50% greater stopping and holding power, requires 50% less effort to operate.

Tilt Cab Tandem Ford C-950 (above) has hydraulic loader with push-button remote control.

BRAND-
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Go *FORD-WARD* for savings FORD TRUCKS CO

FREE—COMPLETE FACTS ON NEW EXTRA HEAVY DUTY TRUCKS
Check Choice of Booklets and Return to:
FORD Division of FORD MOTOR COMPANY
P.O. Box 658, Dearborn, Michigan
☐ Extra Heavy Duty Conventional and Tilt Cab Trucks
Up to 36,000-lb. GVW, 65,000-lb. GCW
☐ Tandem Axle Models
Up to 51,000-lb. GVW, 75,000-lb. GCW
Name
Address
City
State

above)

BRAND-NEW TILT CAB TANDEM FORDS for '59 combine the easier, more economical maintenance of tilts with high tandem-axle load capacities. Tilt design also permits higher front axle loads, longer body on given wheelbase. C-950 Tandem, above, operated by Fairlawn Supply and Concrete, Akron, has 15,000-lb. front axle, 34,000-lb. rear. Carries up to 6,500 brick, compared to 5,000 on a conventional tandem. Has 401-cu. in. V-8, 5-spd. main transmission, 3-spd. auxiliary, 201-in. wb. GCW (with pup trailer) 72,000 lb.

KS COST LESS ... *less to own ... less to run ... last longer, too!*

Sloped trench licks cave-ins on Denver waterline

Digging 6 feet deep in loose sandy loam, this Cleveland 240 sloped trench from 90-inch top width to 34-inch bottom width, eliminating serious cave-ins. Picture shows its 30-inch wide, power-shift conveyor easily discharging the large-volume spoil.

Owner Fred Linneman of Denver uses his versatile 240 on many different types of trenching jobs, averages 20 feet of trench per minute on small mains and service lines in this area. Transport is no problem since the 240 is only 8 feet wide overall and its conveyor power folds to within this width.

The Cleveland 240 digs down to 6'3" deep, covers a wide range of trench widths. Get full information now.

Good Everywhere

The CLEVELAND TRENCHER Co.

20100 St. Clair Avenue • Cleveland 17, Ohio

$47,700 is cost per mile of . . .

63 Mile Road in Ecuador

A new 63 mile road from Quevedo to Santo Domingo, Ecuador, to cost an average of $47,701 per mile, will be built in two sections. The awards break down like this:

Contract:	Amount	% of Total
To: Leonardo Guarderas, Guayaquil, Ecuador Section from Quevedo to Puerto Ila.	$1,670,890	62.3
To: Compania Simar, Quito, Ecuador Section from Puerto Ila to Santo Domingo	1,134,307	37.7
Total Project	3,005,206	100.0
Engineer's Estimate Radar & Associates, Miami, Fla. and Quito, Ecuador	$3,037,150	
% under engineer's estimate		1.0

The bids, in sucres, have been converted by the engineers into dollars at the rate of 15.15 sucres per dollar; the quantities, in metric measure, to long measure.

The 22 ft wide road, with grading averaging 8 cu yd to the lin ft, traverses gently rolling country, requiring no large drainage structures. Double bituminous surface treatment, at 58¢ per sq yd, is the only item more costly than in the U.S.

Native Ecuadorian labor will be employed. Prevailing wage rates include: carpenters, $1.19 per 8 hour day; tractor operators, $3.30; shovel and crane operators, $3.96; common laborers, $0.80. Most of these contractors employ U.S. or European superintendents and top shift bosses at salaries about 20% greater than they earn at home.

	Quito to Puerto Ila	Puerto Ila to Santa Domingo
1C Leonardo Guarderas, Guayaquil, Ecuador	$1,670,890	
1C Compania Simar, Quito, Ecuador		$1,134,307
2 Granada, Miami, Fla.	2,678,310	1,162,435
5 Inca, Ecuador	2,467,412	
8 H. T. Smith		1,336,472

The unit prices shown here are for the entire 63 mile project:

Bids: 7-8-58 Items	Unit	Quantity	Unit Prices 1C	2
Clear & grub	ac	1,006	$53.43	$65.16
Excavation, unclassified	cy	1,994,550	0.339	0.335
structural	cy	13,440	1.14	0.90
Select matl under structs.	cy	10,929	1.23	2.11
Borrow	cy	668,340	0.37	0.336
Subbase, select material	cy	514,929	1.65	1.71
Base crse, grav with binder	cy	107,250	2.41	2.29
Dbl bit surface treatment	sy	797,730	0.58	0.83
CMP culvert, 30"	lf	4,072	6.11	5.46
36"	lf	3,593	11.06	8.68
42"	lf	699	14.41	10.70
Concrete	cy	567	22.97	27.78
reinforced	cy	5,854	57.27	66.96
cyclopean	cy	458	26.66	21.26
Kilometer marker	ea	101	5.26	2.97

Completion schedule: 22 months.
Liquidated damages: $200 per day.

Parking and Roadway for Air Terminal

Fill at $1.44 a cu yd accounts for one-third of this $215,117 contract for parking lots and roadway at the Midland, Tex., Air Terminal, located on Highway 80, nine miles west of Midland. Asphaltic concrete surfacing accounts for an additional 21% of the cost.

The award to South Texas Construction Co., Corpus Christi, Tex., is 4.4% below the estimate of the Engineering Department, City of Midland, and 21% below the high of the four bids.

To provide access to the terminal building, now being constructed under a separate contract, and to the 31,000 sq yd of parking area, 4,400 lin ft of 54 ft roadway will be constructed. Curb and gutter total 17,793 lin ft.

Class A concrete must be 3,000 psi compressive strength, water-cement ration 7.5 gal to the sack.

The project is on a spur of the main line of the Texas and Pacific Railroad.

1C South Texas Constr. Co., Corpus Christi	$215,117
2 Norris, Hanley & Norris, Abilene, Tex.	221,510
4 Brown & Root, Inc., Houston, Tex.	273,138
EE Engineering Dept., City of Midland, Tex.	225,000

Bids: 6-24-58 Items	Unit	Quantity	Unit Prices 1C	2
Section I				
Conc curb & gut, tp A	lf&i	2,261	$1.58	$1.50
curb, 6x16"	lf&i	910	1.80	1.30
sidewalk, 4"	sy&i	1,491	3.58	4.00
Asph conc surf	f&p	12,014	0.77	1.40
Fill	f&p	cy 26,512	1.44	1.40
Conc, reinf, retain wall	f&c	lf 611	6.00	3.50
Steel pipe rail, 2"	f&i	lf 136	4.50	10.00
Conc electrical tunnel	f&c	lf 224	30.00	9.60
Section II				
Conc curb & gut, tp A	f&i	lf 4,844	1.58	1.50
curb, 6x16"	f&i	lf 227	1.80	1.30
sidewalk, 4"	f&i	sy 36	3.58	4.00
Asph conc surf	f&p	sy 18,580	0.77	1.40
Fill	f&p	cy 23,229	1.44	1.40
Storm drain junct box	f&c	ea 1	240.00	250.00
CM culvert, 29x34"	f&i	lf 240	23.00	20.00
Curb inlets	f&i	ea 3	210.00	150.00
Section III				
Conc curb & gut, tp A	f&i	lf 10,688	1.58	1.50
median, 4"	f&i	lf 3,776	1.85	2.20
Exc, unclassified rdwy	sy	32,280	0.28	0.25
Caliche base, 6"	f&c	sy 28,346	0.65	0.75
Asph conc surf	f&p	sy 28,346	0.77	0.60
CM culv, 14 ga, 18x11"	f&i	lf 480	7.00	6.00
30x17"	f&i	lf 276	11.00	12.00
22x13"	f&i	lf 256	7.90	10.00
Storm drain junct box	f&c	ea 1	240.00	250.00

Commence: 15 days after notice of award
Comp schedule: 105 workin | days Liq dam $50/day
f&c furnish & construct f&i furnish & install f&p furnish & place

Today's Modern Water Tanks Prestressed Concrete Type

Long and Short Term Economies Making Them Popular

A modern prestressed concrete tank is not only economical in first cost, but because of its almost maintenance free character, offers any municipality real long term economy. Any tankage engineering study should include calculated maintenance costs over the estimated life of the facility. Average yearly maintenance on a 3,000,000 gallon steel tank is estimated at $2500 per year at current prices. For a prestressed concrete tank, maintenance is negligible; however, occasional painting for color effect may be desired.

When the charges for servicing the initial cost plus relative maintenance allowances are plotted, the prestressed concrete tank will often show a lower out of pocket cost to the owner in less than 5 years. When these costs and

their increases are extended for an expected service life of 50 years, the savings to the owner with prestressed concrete are enormous.

The prestressed concrete tank is also a good looking tank . . . it is inherently strong and extremely stable . . . it is designed and built for permanence. And, 75% of the contract price is spent right in your local community . . . construction is done with materials and labor available locally.

Write today for more information on Preload Prestressed Concrete Tanks.

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THE PRELOAD COMPANY, INC.
711 Perimeter Road, Kansas City, Missouri

HERRICK IRON WORKS
28400 Clawiter Road, Hayward, California

THE PRELOAD COMPANY, INC.
Jefferson Tower Bldg., 351 Jefferson, Dallas, Tex.

THE CANADA GUNITE COMPANY, LTD.
7325 Decarie Boulevard, Montreal 16, Canada

...ction and Labor Prices Monthly Market Quotations by ENR Field Reporters

See following ENR issues for OTHER PRICES

- Cement, Aggregate Ready-mixed Concrete, Asphalt: Last Sep. 4; Next Oct. 9
- Iron and Steel Products, pipe: Last Sep. 11; Next Oct. 16
- Wood Products, Glass, Explosives, Chemicals: Last Sep. 18; Next Oct. 23
- Clay Products, Lime, Plaster, Paint, Roofing: Last Sept. 25; Next Oct. 30

BUILDING BOARD & LATH AND INSULATION—DELIVERED TRUCKLOAD LOTS

	GYPSUM PLASTER BOARD tapered edge per Msq ft ½"	⅝"	GYPSUM BOARD LATH plain or perf per Msq ft ⅜" x 16" x 48"	GYPSUM SHEATHING tongue & groove per Msq ft ½" x 2' x 8'	FIBER BOARD SHEATHING asph impreg & coat per Msq ft ½" sq ed	½" T&G	FIBER BOARD INSULATION sq edge, paint per Msq ft ½"	MINERAL WOOL INSULATION loose, per 40-lb bag a	3" batts per M sf	GLASS FIBER INSULATION loose, per 40-lb bag a	3" batts per M sf	ALUMINUM FOIL 60# Kraft Expandible 1 side foil Blanket 2 per roll of layers foil 250 s. f. per Msq. ft
Atlanta	$70.00	$80.00	$43.50	$70.00	$70.00	$127.00	$70.00	$1.55[t]	$80.00	$2.00[b]	$75.00	....
Baltimore	81.70[f]	85.55[f]	34.25[f]	55.35[f]	85.00[f]	108.50[f]	89.00[f]	1.20	66.50	1.50	45.00	$4.00[g] $33.50
Birmingham	80.90	87.00	47.77	75.00	85.00	136.80	81.00	1.40	70.00	1.60	75.00	3.13[g] .....
Boston	80.00[m]	86.00[m]	36.00[m]	60.00[m]	85.00[m]	120.00[m]	79.00[m]	1.45[b]	75.00	.....	65.00	5.20 53.50[g]
Chicago	67.00	84.00	45.00	62.00	87.00	123.00	87.00	1.35	80.00	.....	62/65[t]	5.25[g] .....
Cincinnati	68.00[w]	42.55[w]	32.00[w]	51.10[w]	70.00[w]	125.00[w]	73.50[w]	1.30	65.00	1.90	76.80	3.12[g] 50.00
Cleveland	62.00	56.50	41.50	65.00	75.00	126.00	80.00	1.35/1.60	75.00	.....	55.00[w]	17.50[x] 55.00
Dallas	55.00	52.50	42.50	60.00	68.50	117.50	68.50	2.00	62.25	1.45	65.15	4.40[g A] .....
Denver	62.00	54.50	41.00	62.00	75.00	126.00	74.00	.....	71.00[u]	1.30[g]	60.00[u]	11.00[r] 21.00
Detroit	64.00	53.00	37.00	60.00	60.50	100.50	60.50	.....	.....	1.95[b]	68.00	....
Kansas City	65.00	55.00	40.00	.....	72.00	115.00	75.00	1.40	75.00	2.00	75.00	3.60[d] 83.00[t]
Los Angeles	66.00	60.50	0.23[t]	64.50	75.00	125.00	80.00	.....	82.00	1.35[s]	64.00	4.40[g] .....
Minneapolis	75.00	65.00	0.41[t]	80.00	78.00	140.00	78.00	2.00[y]	80.00	1.80	80.00	5.50 .....
Montreal	56.00	47.40	26/30	53.00	63.25	.....	62.00	1.50	66.00	1.50	66.00	9.00[g] 55.00
New Orleans	60.00	50.00	45.00	60.00	75.00	140.00	72.50	1.75	65.00[w]	.....	.....	....
New York	55.25	47.25	36.25	54.25	75.00	120.00	75.00	1.55[b]	66.50	1.55[b]	66.50	4.25[g] 52.50[c]
Philadelphia	50/55	48/53	36.40	48/54	68/73	105/110	55/65	.....	60/70	.....	70/75	5.60/6.34 40/50
Pittsburgh	.....	65.00	40.00	.....	82.50	102.50	87.50	1.05[s]	55.00[s]	1.05[s]	55.00[s]	3.50[s] 38.50
St. Louis	67.00	56.50	40.00	70.00	76.50	121.50	80.00	1.35[y]	85.00	1.85	70.00	4.50[g] .....
San Francisco	57.00	48.00	0.35[t]	58.00	68.00	100.00	67.00	1.80	66.50	1.80	66.50	4.95 55.00
Seattle	66.30	57.65	51.05	65.00	74.50	138.00	73.50	1.60[z]	74.00	1.90[p]	50.00[w][t]	4.25 46.50
Toronto	55.00	47.00	38.00	64.50	75.00	.....	1.50	62.50	.....	.....	62.50	16.00[g] 46.00

[a] F.o.b. warehouse. [b] Semi thick. [c] 30/ bag. [d] 12" to 24" width. [e] 48/ kraft paper, 5 Msf, 100/500 rolls. [f] 20/ sq ft bag, 4" thick. [g] Full trailer loads. [h] 60/ kraft paper backing 400 rolls or over. [i] LCL. [j] 40/. [k] 80/. [l] 2". [m] 10 ton quantities. [n] Distributor's siding. [o] Per Msf roll. [p] 32/ bag. [q] 500 sf. [r] Per cwt. [s] 35/ bag. [t] 28/ bag. [u] Flame Proof $75. [v] F.o.b. city. [w] Sq. yd. [x] 30/ bag. [y] Spun rock wool, 3½ cu ft bags. [z] 650 sf.

HOURLY WAGE RATES—Base rate + fringe benefits

	Bricklayers	Carpenters	Struct. Iron Workers	Hoisting Engineers	Plasterers	Electrical Workers	Steamfitters	Common Labor Building	Common Labor Heavy Cons
Atlanta	$3.75	$3.05	$3.15+7½[d]	$3.225	$3.125	$3.60	$3.30+25[d]	$1.70	$1.70
Baltimore	3.90+10½[d]	3.20+7½[d]	3.90+7½[d]	3.80/3.95+10[c g]	3.45+7½[d]	3.42[g]+7½[d]	3.30+7½[d]	2.05+7½[d]	2.05+7½[d]
Birmingham	3.85	2.95	3.35+10[c]	2.77[s]	3.17	3.425	3.40+10[c]	1.75	1.85
Boston	3.75+20[c]	3.40+10[c]	3.70+20[c]	3.77½+10[c]	3.65+35[c]	3.70+12½[d]	3.20+10[c]	2.55+ 7[c]	2.50+7[c]
Chicago	3.87½+7½[c]	3.65+20[c]	4.00+16[c]	3.55+5[c]	3.70+23[c]	3.90+12½[d]	3.75+22[c m]	2.77½+7½[c]	2.77½+7½[c]
Cincinnati	3.85	3.57½	3.60+10[c d]	3.375/3.60	3.62½	3.82+46[k]	3.80+9½[c]	2.62½	2.525
Cleveland	3.905+10[c]	3.83	3.73+10[c]	3.83	3.83	3.855	3.73+10[c d]	3.10	3.005
Dallas	3.875	3.175	3.225+7½[d]	3.20 /3.25	3.56½+10[c]	3.375+7½[c R]	3.375+8½[c]	1.70	1.70
Denver	3.75	3.25	3.175+7½[d]	3.05	3.475+12½[d m]	3.60+14[c]	3.55+10[c d]	2.17	2.17
Detroit	3.77+38[d]	3.40+40[c]	3.75+22½[d]	3.47+25[d h]	3.65+34[c]	3.85+34½[c]	3.73½+14[c R]	2.65+35[c]	2.80+10[c]
Kansas City	3.85	3.325	3.40	3.345	3.625	3.60+28[c O]	3.40+9[c W]	2.355	2.405
Los Angeles	3.85+10[c h k]	3.375+10[c d]	3.95+20½[c k]	3.41+10[c d]	4.00+30[d I]	4.15[f]	3.80+38½[c f]	2.68+10[c d]	2.68+10[c d]
Minneapolis	3.725	3.30	3.47	3.30	3.40+23[c g]	3.38+35[c m]	3.42+20[c]	2.55	2.55
New Orleans	3.475+5[c]	2.95	3.25+7½[c]	3.075+7½[c]	3.07+5[c]	3.475+7½[c]	3.40+15[c]	1.70	1.70
New York	4.45+38[c v]	4.10+33[c v]	4.30+36[c v]	4.35+35[c v]	4.35+52[c h]	3.90+51[c R]	4.30+47[c h l]	3.00+24[c R]	3.00+24[c R]
Philadelphia	4.00+17[c]	3.635	4.23+17½[c R]	4.095+10[c]	3.90+15[c]	4.07½+16[c m]	4.00+11½[c]	2.35	2.65
Pittsburgh	4.15+20[c m]	3.675+10[c]	4.00+20[c d]	3.64+10[c d]	3.825+20[c m]	4.35+32½[c d]	4.00+20[c m]	2.45+20[c m]	2.30+20½[f l]
St. Louis	3.90+31½[c]	3.575+10[c]	3.60+7½[c]	3.675[s]	3.80+7½[c]	3.971+29[c]	3.92½+27½[c]	2.625+10[c]	2.625+10[c]
San Francisco	3.95+52½[c d d]	3.30+32½[c m m]	3.95+20[c]	3.405+10[c]	3.74+52½[c]	3.91+34½[c f]	3.70+45[c R]	2.685+10[c]	2.685+10[c]
Seattle	3.90+10[c d]	3.13+10[c d]	3.40+10[c d]	3.29+20[c]	3.40+10[c d]	3.65+26[c x]	3.70+23[c f]	2.70+10[c d]	2.70+10[c d]
Montreal	2.20+5½[j]	2.10+5½[j]	2.25+5½[j]	2.00+5½[j]	2.35+5½[j]	2.20+5½[j]	2.32+5½[j]	1.50+3½[j]	1.50+3½[j]
Toronto	2.85+11[c]	2.50+10[c]	2.55+17[c]	2.60+10[c]	2.70+19[c l]	2.90+11[c]	2.79+19[c l]	1.65+6[c]	1.65+6[c]

ENR Skilled Average (Bricklayers, Carpenters, Iron Workers): $3.743. ENR Common Average $2.472.
R: revised.

[a] Cost of living bonus inc., in base pay. [b] 8 hr day. [c] 7 hr. day. [d] 5% vac. stamp fund plus 12¢ WF for bricklayers; 4% VF for electricians plus 10¢ WF, 1% PF. [e] H & WF. [f] 10¢ H & W. 10. VF. [g] 10¢ H & W, 5¢ VF. [h] 2¢ Ed, 7½¢ H & W. [i] $2.85 homes & housing plus 7½¢ WF. [j] Inc. 4% VF; 1% PF nd by employer. [k] 10¢ WF, 10¢ VP, 5¢ HP. [l] 4% VF. [m] 10¢ WF, 10¢ PF. [n] 7%V & Hol., 3% H & W, 1% PF. [o] 10¢ WF, 10¢ PF. [p] 3% WF, 3% PF+10¢ in lieu of pd. hol. [q] 10¢WF, 6% V & H, 3% PF. [r] 4% WF, 20¢ PF. [s] 8% W & PF, 4% VF, 1% NC 1% JI, plus 6 PH. [t] Inc. 10¢ WF. [u] 10¢ WF, 1% PF, 1½% apprent. [v] 1 drum; 2 drums, 2.93. [w] 20¢ VF, 17½¢ PF, 3% Prom., 12¢ W. [x] 2% VF. [y] 10¢ H & W, 10¢ PF. [z] 10¢ WF, 8¢ HP, 15¢ V & H. [A] 15¢ WF, 15¢ PF, 20¢ BF. [B] 7½¢ VP, 5¢ PF, 1½¢ Ed. F. [C] 9¢ H & W & Ins., 7% V & H. [D] 10¢ H & WF, 5¢ indus. prom. [E] 6% WF, plus travel pay per day. [F] Plus $4 per day annuity contrib. [G] 10¢ WF, 10¢ VF, 3¢ prom. [H] 10¢ WF. 10¢ VP, 3% PF, 2% PH. [I] 5¢ H & WF, 5¢ advtg. [J] 5% WF, 6 PH, 3% PF. [K] 25¢ W & PF, 15¢ VF, plus 6¢ misc. [L] 3% WF, 3% PF, 3% VF, 1% Ed. F. [M] 10½¢ WF, 7½¢ PF. [N] 1% PF. [O] 10¢ WF, 1% NEGA, 3¢ AF. [P] 10¢ H Ins., 7½¢ PF, 5¢ VF. [Q] 2 drums; 1 drum $3.10/3.25+10¢ WF. [R] 10¢ H & WF, 2¢ admin. 1¢ apprent. [S] 10¢ H & WF, 15¢ PF. [T] H & W, VF, 10¢ WF, 18½¢ VF, 1¢ PF, 5¢ Ind. F. [U] 4% WF, 6% PF. [W] 7½¢ WF, 11½¢ Ed. F. [X] 7½¢ WF, 15¢ VF, 3½¢ PF. [Y] 7½¢ WF, 20¢ PF, 18¢ PH, 5¢ Jt Bd. [Z] 10¢ H & W, 5¢ PF. [a] 10¢ Ins. [b] 7½¢ H & WF, 5¢ indus. prom. [c] 4% WF, 4% PF, 6 PH. [d] 2% VF. [e] 10¢ HW, 10¢P, ½¢ AF. [f] 10¢ HW, 10¢ PF, 5¢ Trust F, 5¢ Trade Prom. [g] 10¢ W, 20¢ PF, 2½¢ Gen. Ben.

	Truck drivers 1½ T	Truck drivers under 4 cy	Truck drivers over 4 cy	Tractor Operators incl. helpers 34-48 hp	Tractor Operators incl. helpers 70-100 hp	Tractor Operators incl. helpers 100 & over	Tractor scraper 15-18 cy	Power cranes & shovels ½ cy	Power cranes & shovels ¾ cy	Motor grader opar	Air comp oper	Air hoi oper
Atlanta	$1.70	$1.80	$2.05	$2.70	$2.85	$2.85	$2.70	$3.225	$3.375	$2.70	$2.625	$1.77
Baltimore	2.00+7½[c]	2.00+7½[c]	2.10+7½[c h]	3.40/3.55 +10[c h]	3.40/3.55 +10[c h]	3.40/3.55 +10[c h]	3.40/3.55 +10[c h]	3.80/3.95 +10[c h]	3.80/3.95 +10[c h]	3.40/3.55 +10[c h]	2.85/3.00 +10[c h]	2.10+7½[c]
Birmingham	1.83	2.02[f f]	2.35[c c]	2.79	2.79	2.79	2.93	2.93	2.93	2.82	2.82	1.90
Boston	2.30[b c]	2.45[c]	2.65[c]	3.40+10[c c d]	3.40+10[c c d]	3.40+10[c c d]	3.40+10[c c d]	3.775+10[c]	3.775+10[c]	3.40+10[c]	3.325+10[c]	2.80+7[c c]
Chicago	2.26+15[c f]	.....	.....	3.30+5[c]	3.45+5[c]	3.20+5[c]	3.00+5[c]	3.90+5[c]	3.90+5[c]	3.25+5[c]	3.10+5[c]	.....
Cincinnati	2.45+2½[c]	2.55+2½[c]	2.65+2½[c c]	3.375	3.375	3.375	3.375	3.375	3.60	3.60	3.60	3.60
Cleveland	2.25+10[c]	2.75+10[c]	2.75+10[c]	3.58	3.58	3.58	3.58	3.83	3.83	3.58	3.455	3.455
Dallas	1.70	1.70	1.70/2.625[f]	1.70/2.625[f]	1.70/2.625[f]	1.70/2.625[f]	1.70/2.625[f]	1.70/2.625[f]	1.70/2.625[f]	1.70/2.625[f]	1.70/2.625[f]	1.775/2.00[f]
Denver	2.30	2.40	2.55	2.90	2.90	2.90	2.90	3.05	3.05	2.90	2.90	2.45
Detroit	2.80	2.80	2.80	3.50+10[c]	3.50+10[c]	3.50+10[c]	3.50+10[c]	3.50+10[c]	3.50+10[c]	3.50+10[c]	3.225+10[c]	2.71+25[c c]
Kansas City	2.23[b]	2.23[b]	2.405[b]	2.65	3.10[c]	3.10[c]	3.10[c]	3.345	3.345	3.10	3.345[f]	2.45
Los Angeles	2.83+10[c]	2.83+10[c]	3.03+10[c]	3.71+10[c]	3.71+10[c]	3.71+10[c]	3.81+10[c]	3.81+10[c]	3.81+10[c]	3.81+10[c]	2.93+10[c]	2.89+10[c]
Minneapolis	2.55	2.55[c]	2.70[c]	2.93	3.15[c]	.....	3.15	3.37[c]	3.63[c]	2.93	2.82	2.70
New Orleans	2.425+7½[c]	2.425+7½[c]	2.425+7½[c]	3.075+7½[c R]	3.075+7½[c]	3.075+7½[c]	3.075+7½[c]	3.075+7½[c]	3.075+7½[c]	3.075+7½[c]	2.425+7½[c]	1.80
New York	2.21+22½[c c]	3.025+23½[c h h]	3.025+23½[c h h]	3.725+30[c h]	3.725+30[c h]	3.725+30[c h]	3.85+31[c h]	4.60+37[c h]	4.60+37[c h]	3.85+31[c h]	3.85+31[c h]	3.45+28[c c]
Philadelphia	—2.315/2.45+12½[c c]—			—3.34/4.09½+10[c c]—			3.34/4.09½ +10[c c]	—3.34/4.09½+10[c c]—		3.34/4.09½ +10[c c]	3.34/4.095+10[c c]	2.35+15[c c]
Pittsburgh	2.37+20[c m]	2.51+20[c m]	2.61+20[c m]	3.44+10[c]	3.44+10[c]	3.44+10[c]	3.44+10[c]	3.64+10[c]	3.64+10[c]	3.64+10[c]	3.15+10[c]	2.30+20[c m]
St. Louis	2.65+7½[c c]	2.70+7½[c c]	2.70+7½[c c]	3.675[h h]	3.675[h h]	3.675[h h]	3.675[h h]	3.675[h h]	3.675[h h]	3.675[h h]	3.125[h h]	3.125[h h]
San Francisco	2.81+10[c]	2.75+10[c]	2.90+10[c]	3.70+10[c]	3.70+10[c]	3.70+10[c]	3.70+10[c]	3.85+10[c]	3.85+10[c]	3.75+10[c]	3.10+10[c]	2.955+10[c]
Seattle	2.87+17½[c c]	2.87+17½[c d d c]	3.07+17½[c c]	3.26+20[c f]	3.26+20[c f]	3.26+20[c f]	3.26+20[c f]	3.63+20[c f]	3.63+20[c f]	3.35+20[c f]	2.99+20[c f]	2.90+10[c f]
Montreal	1.80+3½[f f]	1.80+3½[f f]	1.80+3½[f f]	1.70+4½[f f]	1.93+4½[f f]	1.93+4½[f f]	1.93+4½[f f]	2.19+5½[f f]	2.19+5½[f f]	1.93+4½[f f]	1.80+4½[f f]	1.80+4½[f f]
Toronto	1.75+9[c c]	1.75+9[c c]	1.75+9[c c]	2.00+8[c c]	2.10+8[c c]	2.10+8[c c]	2.10+8[c c]	2.60+10[c c]	2.60+10[c c]	2.10+8[c c]	2.15+9[c c]	2.15+9[c c]

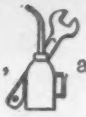
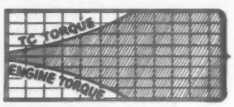
[a] H & WF. [b] lower rates, straight time; other broken. [c] 2-axle; 10 wh. 3 axle $2.45; Euclid $2.65. [d] intermediate. [e] bldg contr.; highway $2.45+7¢ WF. [f] less than 2-T. [g] up 8 cy. [h] 4% WF, 4% PF. [i] 6-8 cy. [j] plus $2 pd by employer for hosp. death benefits to family. [k] bldg constr; steel contr $3.475. [l] higher rates are union, other taken from min. wage approved by County Comm. Court. [m] 10¢ H & W, 10¢ PF. [n] flathed. [o] under 10 cy. [p] over 10 cy. [q] over 50 hp. [r] blade grader. [s] WF. [t] single. [u] Incl. 10¢ H & W. [w] 7½¢ H & W. 5¢ PF. [x] 7½¢ WF, 10¢ PF. [y] to 3½ cy. [z] 3½ cy & over. [aa] plus W & PF. [bb] 3% WF, 2% PF; plus 11 PH. [cc] 11¢ WF, 11½¢ PF, 11 PH. [dd] up to 5 cy. [ee] 5 cy & over. [ff] 1½ to 3 T. [gg] up to 5 T; 5 T & over, 2.12. [hh] 5¢ H & WF ,2½¢ PF. [ii] 4% VF. [kk] Incl. 10¢ WF. [ll] Incl. 2% VF. [mm] 10¢ H & WF, 10¢P, 5¢ VP. [oo] Plus $2.25 wk. WF. [nn] 5% WF, plus 6 PH. [tt] 10¢ H & WF, 10¢ PF. [R] revised

MEXICO CITY PRICES

Pesos, F.o.b. City		Aug. '58	Sept.'58
Common Wages—Building (8 hr. day) (Pesos)	av. per hr.	1.57	1.57
Common Wages—Heavy Const. (8 hr. day) (Pesos)	av. per hr.	2.00	2.00
Skilled Labor Wages			
Carpenters (8 hr. day) 1 cl.	av. per hr.	3.25	3.25
Bricklayers (8 hr. day) 1 cl.	av. per hr.	2.87	2.87
Struct. Iron Workers (8 hr. day)	Remachadores. av. per hr.	4.38	4.38

Struct. Steel, Shapes	Aug. '58	Sept. '58
3"-18" x 12 meters ... per metric ton	2400.00[f]	2400.00[f]
[f] fob Monterrey		
Reinf. Steel, Corrugated Rods		
⅜" x 11 meters ... per ton	1800.00	1800.00
½" x 11 meters ... per ton	1800.00	1800.00
⅝" x 11 meters ... per ton	1750.00	1750.00
¾" x 11 meters ... per ton	1750.00	1750.00
⅞" x 11 meters ... per ton	1750.00	1750.00
1" x 11 meters ... per ton	1750.00	1750.00

Gravel truck load at 3½ cu. meters		Aug. '58	Sept. '58
Blue Gravel	per tr. load	81.00	84.00
Rose Gravel	per tr. load	65.00	65.00
Cement, Std. Port. (Tolteca)	per ton	230.00	230.00
Lumber			
1" Pine	per M ft.	1700.00	1700.00
1½" Pine	per M ft.	1900.00	1900.00

HERE'S HOW AND WHY A NATIONAL TORQUE CONVERTER on your heavy equipment can give you more usable power from your engines, reduce excessive maintenance,  and increase machinery life. When equipment driven by a direct-connected engine is overloaded engine speed drops. So does the "Torque" which is the turning-force delivered by crank-shaft. If the overload continues, the engine stalls and its torque drops to zero. When equipment driven through a NATIONAL TORQUE CONVERTER is overloaded, it cannot stall the engine! Engine speed and engine torque both "level-off" in their most efficient zones, and stay there! The torque-converter shaft slows down but at the same time its torque increases! If equipment overload increases, the converter output shaft finally stalls, but at this point it is delivering maximum torque. Now if you put the diagram showing how engine torque drops under equipment overload, with the diagram showing how torque converter torque increases under the same overload, you'll see between the two a  "bonus-power" zone of extra usable power that the NATIONAL TORQUE CONVERTER gives you. Power that makes an oversize engine or "babying" of equipment unnecessary. Furthermore, shocks and strains that batter and age equipment are absorbed in the converter. Machinery lasts longer with less maintenance. If YOU own or operate heavy equipment (with 100 to 1000 hp drives) ask for performance records and recommendations.

THE NATIONAL SUPPLY COMPANY

Subsidiary of Armco Steel Corporation

TWO GATEWAY CENTER, PITTSBURGH, PA.

Bids Asked—Low Bidders—Contracts Awarded—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager
J. A. MAHONEY, M. WETZEL, M. E. SCIORRA, D. TARTAGLIA, Reports
J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

October 6 Connecticut

STREETS AND ROADS

October 6 Connecticut October 7 Massachusetts

▲† **R. I., Newport**—FLEET BERTHING PIERS, etc.—BA 11/4—Dist. P. Wks. Office, 1st Naval Dist., Bldg. 37, 495 Summer St., Boston, Mass., fleet berthing piers, steam facilities, U. S. Naval Station, NBy 11078, Spec. 11078/56 (rev.). Over $1,000,000. Plans deposit $115. CD 9/8.

BUILDINGS—BA

▲ **Mass., Swampscott**—SCHOOL—BA 10/9—Junior High School Bldg. Comn., 24 Redington St., Swampscott, Junior High School, Whitney Estate. $1,645,000. Plans deposit $100. John M. Gray Co., 153 Milk St., Boston, archts. CD 8/7.

HEAVY CONSTRUCTION—LB & CA

▲† **Five Boro Constr. Corp.**, 2 Lafayette St., New York, N. Y., LB $2,967,000, Wherry Housing imprvs., Loring Air Force Base, Inv. 17-600-59-11, LIMESTONE, ME. Base Procurement Office, Loring Air Force Base, Limestone, Me. Bids Sept. 16. CD 9/17.

▲ **CONNECTICUT**—State Hy. Dpt., State Office Bldg., Hartford,
Brunalli Constr. Co., Summer St., Southington, Conn., CA $4,940,683, grading, drainage, lighting traffic control, concrete paving 11,146 lin. ft. Route 8, Proj. 87-67. Bids Aug. 11. CD 8/13, under LB.

BUILDINGS—LB & CA

▲ **Vappi & Co., Inc.**, 240 Sidney St., Cambridge, Mass., LB $1,448,355, DORMITORY and LIBRARY BLDG., Huntington Ave., BOSTON, MASS. New England Conservatory of Music, 290 Huntington Ave., Boston, Mass. Bids Sept. 18. CD 8/26.

▲ **Julius Meshberg**, 22 Woolsley Ave., Trumbull, Conn. Owner Builds. $3,000,000, HOUSES, "Gaylord Village", Gaylord Mountain Rd., HAMDEN, CONN. CD 11/28/56.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

October 26 New Jersey & Pennsylvania

STREETS AND ROADS

October 7 Maryland October 14 New Jersey

▲ **N. Y., Brooklyn**—BA 10/22—Dpt. P. Wks., Rm. 2200, Municipal Bldg., New York, Zone 7, Contr. No. 15, force main tunnel, Newtown Creek pollution control project, Brooklyn and Manhattan Boros. Plans deposit $80. CD 11/16/44.

BUILDINGS—BA

▲ **N. Y., Centereach**—SCHOOL—BA 10/7—Centereach-Selden School Dist. No. 11, Unity Drive School, Centereach, 1,200 pupil high school, Marshall Dr. $2,000,000. Frederic P. Wiedersum Assoc., 65 Roosevelt Ave., Valley Stream, archts. CD 3/4.

▲ **N. J., Paterson**—HOUSING—BA 10/8—Housing Auth. of City of Paterson, 29 Harrison Place, 550 unit, low-rent housing, Lane, Temple, Northwest and Mattlock Sts., Proj. NJ 21-5. $8,500,000. Extended date, Kelly & Gruzen, 10 Columbus Circle, New York, N. Y., archts. CD 9/5.

▲ **Pa., Phila.**—NURSES RESIDENCE—BA 10/9—University of Pennsylvania, 3025 Walnut St., nurses residence $2,000,000. Extended date. Schmidt, Garden & Erikson, 104 S. Michigan Ave., Chicago, Ill. archts.-engrs. CD 9/17.

▲ **N. Y., Jamaica**—HOUSING—BA 10/21—New York City Housing Auth., 299 Broadway, New York, Zone 7, general constr., heating and ventilating, electric work and plumbing for (A) Baisley Gardens Houses (Proj. No. NYC-32) Foch Blvd., 157th St., 116th Ave. to 195th St. and New York Blvd. (B) Baisley Park Houses (Proj. No. NY-5-38) Long Island Railroad, Foch Blvd., New York Blvd. to Foch Blvd. in area by 116th Ave., Bedell St., New York Blvd., Foch Blvd. to New York Blvd. and 159th St. (C) Baisley Gardens Houses (Proj. No. NYC-32) and Baisley Park Houses (Proj. No. NYC-32) and Baisley Park Houses (Proj. No. NY-5-38) in areas above described, Queens Boro. Plans deposit $75. CD 8/2, under LB.

▲ **N. J., New Brunswick**—COUNTY COURT HOUSE—BA 11/25—Bd. Freeholders, Court House, county court house, $3,000,000. Alexander Merchang Assocs., 1 Elm Row, archts. CD 6/3.

HEAVY CONSTRUCTION—LB & CA

▲ **NEW YORK**—Dpt. P. Wks., State Office Bldg., Albany,
Posillico Cont. Co., Inc., 618 Old Country Rd., Westbury, N. Y., CA $1,111,200, est. $1,344,000, Glen Cove Arterial, Cont. 2 (Long Island R.R. to Pratt Blvd.) 0.59 mi., Nassau Co. Bids July 17. CD 7/21, under LB.

▲ **NEW YORK**—Dpt. P. Wks., State Office Bldg., Albany,
N. Y.—Rusciano Constr. Corp., & Del Balso Constr. Corp., Pelham Manor, N. Y., CA $5,081,493, constr. 1.05 mi. Interstate Rd. Conn. No. 512, Major Deegan Expressway, Bronx Co.;
N. Y.—Slattery Contg. Co. Inc., & Slattery Tunnel Corp., 46-36 54th Rd., Maspeth, N. Y., CA $9,968,528, est. $12,417,000, 0.63 mi. Inter. Rte. Conn. No. 516, Bruckner Expressway between St. Ann's Ave. and East 141 St., Bronx Co. Bids Aug. 28, awarded Sept. 15. CD 9/4, under LB.

▲ **Arundel Corp.**, 501 St. Paul Pl., Baltimore, Md., **L. E. Dixon Co.**, 409 S. California St., San Gabriel, Calif. and **Hankin-Conkey Constr. Co.**, 1740 E. 12, Cleveland, O., CA $39,834,292, Tuscarora Power Plant involving 2,715,000 cu. yd. excav., unclassified, 28,500 lin. ft. drill holes for exploration and grouting, 583,-800 cu. yd. concrete, 35,000,000 lb. rein.-steel, 1,283,000 misc. metal work, 1,049,000 lb. erection structural steel, 6,880,000 lb. erection gates, gate and stop log guides, Lewiston, Niagara Co., Spec. No. PA-N 23007, Niagara Contr. No. N 10, NEW YORK. Power Authority of State of New York, The Coliseum Tower, 10 Columbus Circle, New York 19, N. Y. Bids Sept. 19. CD 9/11, under LB.

▲ **Chicago Bridge & Iron Co.**, 332 S. Michigan, Chicago, Ill., CA $10,992,000, 13 penstocks at Niagara Power Proj. NP-22, NEW YORK. Power Authority of State of New York, The Coliseum Tower, 10 Columbus Circle, New York 19, N. Y. CD 9/17, under LB.

▲ **General Railway Signal Co.**, 230 Park Ave., New York 17, N. Y., CA $9,745,400, block signaling and interlocking equip. for rehabilitation of Broadway Line, BMT Div., Whitehall St. to Lexington Ave., Manhattan Boro, Contr. S-92, NEW YORK, N. Y. New York City Transit Auth., Rm. 1310, 370 Jay St., Brooklyn 1, N. Y. Bids Sept. 5. CD 9/10, under LB.

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings **$93,000; other buildings $344,000. Also Foreign projects of $100,000 and more in size of Interest to American contractors.**

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED
New England
Middle Atlantic
South
Middle West
West of Mississippi
Far West
PROPOSED WORK
Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Public Buildings
Mass Housing
Commercial Buildings
Industrial Buildings
Unclassified

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.

BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.

SOON LETS CONTRACT: SLC

LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily Issue in which last previous report was published.

OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

† Federal Government
▲ Project of $1,000,000 or over
ENR Engineering News-Record
CD Construction Daily
For additional reports see Construction Daily.

▲† **Gahagan Dredging Corp.**, 90 Broad St., New York 4, N. Y., CA $1,102,949, dredging to depth of 35 ft. below mean low water, removing 1,500,000 cu. yd. place measurement all material except ledge rock from New York and New Jersey Channels, Section 4, Areas 6 and 10, CIVENG-30-075-59-10, NEW YORK and NEW JERSEY. U. S. Eng., 111 E. 16th St., New York 3, N. Y. Bids Aug. 28. CD 9/3, under LB.

▲ **Bayler Constr. Co.**, 210 E. 40 St., New York, N. Y., CA $1,089,265, est $1,313,923 (6 bidders), water treatment plant, Pequannock, NEWARK, N. J. City, City Hall, Newark, N. J. Grand total $1,243,033. Bids Sept. 9. CD 8/22.
Kelgia Assocs., Inc., 65 Clifton Blvd., Clifton, N. J., CA $98,168, steel, (Newark, N. J.).
Ernest Jarvis Co., 236 Chestnut St., Newark, N. J., CA $55,600, electric (Newark N. J.).

▲ **Tibbetts Constr. Co.**, 1 Lawton Ave., Yonkers, N. Y., LB $3,324,560, est. $4,000,000 (2 bidders), general contract sewerage sys. extensions, NORTH BERGEN, N. J. Twp. of North Bergen, Municipal Bldg., North Bergen, N. J. Bids Sept. 17. CD 8/28.

▲ **PENNSYLVANIA**—Pa. Hys. Dpt., 506 North Office Bldg., Harrisburg,
Pa.—Dravo Corp., Dravo Bldg., Pittsburgh 25, Pa. CA $1,957,022. 2 main piers for Fort Duquesne Bridge; 7 bents for approaches, stairway landing and rein.-con. retaining walls, 1,115 ft. L.R. 246 (14) Pittsburgh, Allegheny Co.;
Pa.—U. S. Steel Corp., 1236 Suburban Station Bldg., 1617 Penn Blvd., Phila. 3, Pa. CA $2,891,341. superstructure for main river span and 2 flanking spans Fort Duquesne Bridge, 659 ft. L.R. 246 15 Pittsburgh. Allegheny Co. Bids July 24, awarded Sept. 18. CD 7/28, under LB.

▲ **PENNSYLVANIA**—Pa. Hys. Dpt., 506 North Office Bldg., Harrisburg,
Buckley & Co., Inc., 1317-21 S. Juniper St., Phila. 47, Pa. CA $4,384,657, 3,152 ft. Roosevelt Blvd. exten., concrete, steel viaduct and divided hy. c. conc. roadway, 27 ft. one side; 36 ft. one side. L. R. 67058 (4) Phila., Phila. Co. Bids Aug. 29. CD 9/3, under LB.

▲ **MARYLAND**—State Rds. Comn., 108 E. Lexington St., Baltimore, Zone 2,
A. H. Smith, Branchville, Md., CA $1,054,848, grading, drainage, surf. Northbound lane US 301 near Cheltenham, P 713-3-320, Prince George Co. Bids Aug. 26. CD 8/12.

▲ **MARYLAND**—State Rds. Comn., 108 E. Lexington St., Baltimore, Zone 2,
Wright Contg. Co., Odenton, Md., CA $1,903,049, grading, drainage, surf. 3.719 mi. New Columbia Pike and US 29, Contr. M-531-3-320, Montgomery Co. Bids Aug. 26. CD 8/29, under LB.

▲ **Gunnell Constr. Co., Inc.**, Tower Bldg., Wash., D. C. LB $2,187,000 (4 bidders), sewage treatment plant addn., addnl. sludge handling facilities, Unit 24, WASH., D. C. D. C. Govt. Dpt. Sanitary Engineering, 499 Pa. Ave. N. W., Wash., D. C. Bids Sept. 18. CD 8/26.

BUILDINGS—LB & CA

▲ **Malin Constr. Co.**, 2 Park Ave., New York, N. Y., CA Est. $3,000,000, HOSPITAL, Horace Harding Bldg. and Main St., FLUSHING, N. Y. Owner, c/o Contractor.

▲ **Heatherwood Homes**, c/o Harry Klein Realty Co., 26 West Jericho Turnpike, Huntington Station, N. Y., Owner Builds. $3,000,000, 200 HOUSES, New York Ave., HUNTINGTON, N. Y.

▲ **Castle Beach Homes**, c/o K. Wastel & Rose, Inc., 782 Allerton Ave., New York, N. Y. Owner Builds. $1,600,000, 100 HOUSES, Norton and Howe Aves., Bronx, NEW YORK, N. Y.

▲ **F. D. Rich Co., Inc.**, 550 Summer, Stamford, Conn., LB $1,536,900, general constr. Proj. No. NY-1-3, 4, 172 APARTMENTS and four-row HOUSE BLDGS. containing 22 apartments, SYRACUSE, N. Y. Syracuse Housing Auth., Common Council Chambers, City Hall, Syracuse, N. Y. Bids Sept. 16. CD 8/22.

▲ **Max Becker**, Chestnut Hills Homes, U. S. Hy. 22, Union, N. J., Own Forces, $1,500,000, 80 HOUSES, Rte. 22 and Vosseller Ave., BRIDGEWATER TWP. (BOUND BROOK P.O.), N. J.

▲ **Wharton Park**, c/o P. Rodney Ludlan, Elwood, N. J., Separate Contracts $2,000,000. RESIDENTIAL DEVELOPMENT, (230) ELWOOD, N. J. Erwin Gerber & A. Pancani, Jr., 11 Commerce St., Newark, N. J., archts.

▲ **Morris Winograd, Park River Towers, Inc.**, 37 Emory St., Jersey City, N. J., Owner Builds, $2,000,000, 8 story, 92 unit air-conditioned APARTMENT, 8800 Boulevard East, NORTH BERGEN, N. J. Isadore Naftali, 312 High St., Newark, N. J., archt. CD 8/14.

▲ **Anthony Leparulo**, 105 New England Ave., Summit, N. J. Own Forces, $1,300,000, 108 unit, glass, steel, concrete APARTMENT, Scotland Rd., SOUTH ORANGE, N. J. Isador Naftali, 312 High St., Newark, N. J., archt.

(Continued on page 74)

Chain Link Fencing of Alcoa Aluminum Now Available Throughout U.S. to Help You Cut Maintenance

Chain link fencing of Alcoa® Aluminum, for highways, divider strips and rights-of-way, is a bigger bargain than ever: the premium you pay for aluminum now amounts to *less* than the cost of one routine painting of ordinary metal fencing.

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• **Enduring Beauty**—Aluminum ages to a pleasing, soft gray; never corrodes or peels.

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Milwaukee—Twin Cities—Denver—New Orleans

(Continued from page 72)

▲ **John McShain, Inc.**, 17th and Spring Gardens Sts., Phila., Pa. CA **$1,632,300.** NURSES HOME, PHILA., PA. Jefferson Hospital, 10th and Sansom Sts., Phila., Pa. Bids Sept. 9. CD 9/10, under LB.

▲ **A. W. Rosenberry**, Kirklyn, Pa. Separate Contracts. **$1,960,000.** RESIDENTIAL DEVELOPMENT, Concord Rd., etc., WESTTOWN, PA. John B. Thompson, Wayne, Pa., archt.

▲ **John McShain, Inc.**, 3501 Sinclair Lane, Baltimore, Md., CA **$1,068,496.** PHYSICS LABORATORY near Scaggsville, Howard Co., BALTIMORE, MD. John Hopkins University, Homewood, Baltimore 18, Md. Voorhees, Walker, Smith & Smith, 101 Park Ave., New York, N. Y., archts. CD 9/22, under LB.

▲ **J. B. Hedin Constr. Co.**, 2900 Newton St. N. E., Wash., D. C., LB **$2,997,000** (11 bidders) constr. Frank W. Ballou SENIOR HIGH SCHOOL, Fourth St. between Mississippi Ave. and Savannah St. S. E., WASH., D. C. D. C. Govt., Dpt. Bldgs. & Grounds, 499 Pa. Ave. N. W., Wash., D. C. Bids Sept. 24. CD 8/22.

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES
October 7 West Virginia

STREETS AND ROADS
October 7 West Virginia October 17 Kentucky

▲† **Kentucky and Tennessee**—BA 10/28—U. S. Eng., 306 Federal Office Bldg., Nashville, Tenn., constr. navigation lock for Barkley Dam, Cumberland River, Livingston Co., CIVENG-40-058-59-3B. Over $15,000,000. CD 9/16.

BUILDINGS—BA

▲ **Fla., Miami**—HOSPITAL—BA 10/23—Miami Baptist Hospital, Inc., 1324 W. Flagler St., 242 bed hospital, N. Kendall Dr. and SW 88 Ave. $3,000,000. Sherlock, Smith & Adams, 3030 Washington Ave., Montgomery, Ala., archts. Charles Payne & Assocs., 4100 N. Miami Ave., engrs. CD 8/28.

HEAVY CONSTRUCTION—LB & CA

▲ **WEST VIRGINIA** — State Road Comn., Charleston, Zone 5,
Bosp & Ritchie, Inc., Ravenswood, W. Va., CA **$1,959,593,** grading, draining and structures 2.017 mi. Interstate Hy. 77, Proj. I-77-3(5) 121, Jackson Co. Bids Sept. 9, awarded Sept. 19. CD 9/16, under LB.

▲ **NORTH CAROLINA**—State Hy. Comn., Raleigh, bids opened 9/23,
N. C.—**Nello L. Teer Co.**, Box 1131, Durham, N. C., LB **$2,754,060** est. $500,000, CABC, 9 in. conc. pavement and shoulder constr. 17.1 mi. Relocation U. S. 301 from N. C. 50 in Benson to U. S. 70-A south of Salem, 8.12343 I-95-2(11)80, Johnson Co.;
N. C.—**Rea Constr. Co.**, Box 3725, Charlotte, N. C. LB **$269,214** est. $250,000-$300,000, b. conc. binder and surf. and structures 7.4 mi. N. C. 27 from Bradford Dr., Charlotte, northwest to bridge over Catawba River 8.86601 DF-621(4) Mecklenburg Co.;
N. C.—**Asheville Contg. Co.**, Box 5119 Asheville, N. C., LB **$255,995** est. $250,000-$300,000, grading, SABC, BST 4.14 mi. N. C. 277 from point approx. 1.6 mi. northeast of Cherryville City limits, easterly to beginning of 24 ft. pavement, 8.86339 DS-884(2) Gaston Co.

▲ **SOUTH CAROLINA**—State Hy. Dpt., Hotel Wade Hampton, Columbia, Bids opened 9/16,
S. C.—**Sloan Constr. Co.**, Peoples National Bank Bldg., Greenville, S. C. LB **$435,863** (7 bidders) b. conc. 20.471 mi. US Rte. 1, S.C. Dockets Nos. 28.348.1 and 28.350, F.A. Projs Nos. DF 89 (5) & DF 89 (7) Kershaw Co; LB **$224,397** grade, etc. 1.005 mi. US Rtes. 29 and 25, S.C. Docket No. 23.357, F.A. Projs. Nos. F-2616 (1) U-2584 (3) Parts 1 & 2 & U-341 (3) Greenville Co.;
S. C.—**S. C. Coastal Development Co.**, Charleston, S. C. LB **$634,950** (2 bidders) constr. hydraulic embankment 0.629 mi. US Rte. 17, S. C. Docket No. 10.451, F.A. Proj. U-215 (2) Charleston Co.;
S. C.—**Green Constr. Co.**, Oaktown, Ind., LB **$1,547,651** (8 bidders) grade, etc. 9.183 mi. Int. Rte 85, S. C. Docket No. 23.412, F.A. Projs. Nos. I-85-2 (5) (I-301-1) (6) Greenville Co. CD 9/8.

▲ **LOUISIANA**—State Dpt. Hys., Hy. Office Bldg., Baton Rouge,
Delta Paving Co., Burma Rd., New Orleans, La., CA **$1,199,972,** c. conc. 6.409 mi. Opelousas-Port Barre Hy. Rte. LA-US 190, SP No. 12-13-34, FAP No. F-169 (17), St. Landry Parish. Bids Aug. 20; awarded Sept. 2. CD 8/28, under LB.

▲ **LOUISIANA**—State Dpt. Hys., Hy. Office Bldg., Baton Rouge,
W. R. Fairchild Constr. Co., Hy. 9 N By-Pass and Box 31, Hattiesburg, Miss., CA **$2,863,447,** c. conc. pavement, grade separation structures 5.468 mi. Choudrant-Calhoun Hy., Rte. 1-20, SP No. 740-00-25, FAP No. I-20-2(10)93 (I-541(10)) Lincoln Parish. Bids Aug. 20, awarded Sept. 11. CD 8/28, under LB.

▲ **KENTUCKY**—Commonwealth of Ky., Dpt. Hys., Frankfort,
Greer Bros. & Young and Greer Bros. & Woodson, P.O. Box 346, London, Ky., CA **$3,262,948,** grade, surf. intersection and frontage roads Winchester-Mt. Sterling Rd. from 0.303 mi. west of Clark-Montgomery Co. line extending northeasterly from point approx. 2.75 mi. northeast of northeast corporate limit of Mt. Sterling 8.842 mi. I 64-5(6), Clark and Montgomery Counties. Bids Sept. 5. CD 9/12, under LB.

▲ **TENNESSEE**—State Hy. Dpt., Nashville, Bids opened 9/19,
Tenn.—B. G. Young, Lamont, Johnson City, Tenn. LB **$1,045,537,** grade, etc. 1.437 mi. Int. Rte. 85, Proj. I-85-1 (3) 75 (Old I-506 (3) Sullivan Co.;
Tenn.—West Tenn. Gravel Co., Dresden, Tenn. LB **$489,733,** gravel or chert surf. 14.109 mi. State Rte. No. 76, Wakley-Henry and Carroll Counties. Proj. F-022-1 (2) Pt. III;
Tenn.—John L. Burns, 2720 Nolensville Rd., Nashville, Tenn. LB **$544,857,** grade, etc. 5.202 mi. State Rte. No. 30. Proj. F-039-1 (1), McMinn Co.;
Tenn.—Ralph E. Mills, 410 Ann St., Frankfort, Ky. LB **$416,428,** grade, drain, 2.751 mi. Interstate Rte. No. 40. Proj. No. I-40-7 (9) 372, Knox Co.;
Tenn.—Tennessee Asphalt Co., Candoro Ave., Knoxville, Tenn. LB **$490,783,** bit. mat., etc. paving 8.185 mi. State Rte. No. 32, Proj. F-032-3 (4), Claiborne Co.;
Tenn.—J. A. Hadley & Pioneer, Humboldt, Tenn. LB **$1,493,778,** grade, etc. 0.335 mi. State Rte. No 31, Proj. F-021-1 (2), Obion Co.;
Tenn.—Wesco Contg. Co., Airport Rd., Chattanooga, Tenn. LB **$495,588** bit. mat. (plant mix) etc. paving 18.924 mi. State Rte. No. 28, Proj. DF-028-1 (13), Sequatchie and Bledsoe Counties;
Tenn.—L&M Constr. Co., 843 Vance Ave., Memphis, Tenn. LB **$3,286,135,** grade, etc. 2.669 mi. section SE Circumferential around Memphis, Proj. No. I-A-40-1 (7) 18, Shelby Co. CD 9/4.

▲ **TENNESSEE**—State Hy. Dpt., Nashville, Bids opened 9/19,
Tenn.—Peter Kiewit Sons, 1024 Omaha National Bank Bldg., Omaha, Neb. LB **$4,184,819,** constr. bridge and approaches across French Broad River 0.710 mi. Int. Rte. No. 40 near present Swann Bridge, State Rte. No. 9 NE of Dandridge. Proj. I-40-8 (5) 426, Jefferson Co.;
Tenn.—Foster & Creighton, 1st American National Bank Bldg., Nashville, Tenn. LB **$818,257,** constr. concrete deck handrail bridge, drainage sys. and lighting for new bridge across Tenn. River in Chattanooga, Proj. U 072-1 (6), Hamilton Co.;
Tenn.—Oman Constr. Co., Acklen Park, Nashville, Tenn. LB **$1,443,114,** constr. 10 bridges, grade, drain approaches 0.953 mi. to directional interchange section Interstate Rte. No. 40 between State Rte. No. 95 (White Wing) and Little Turkey Creek. Proj. I-40-7 (6) 375. Pt. II (Old I-503 (11)), Loudon and Knox Counties. CD 9/4.

BUILDINGS—LB & CA

▲ **John P. Pettyjohn & Co.**, 212 8 Ave., Lynchburg, Va., CA **$2,425,000,** 107-bed HOSPITAL, U.S. 19, CLARKSBURG, W. VA. Union Protestant Hospital Co., 140 Washington Ave., Clarksburg, W. Va. Bids Sept. 18. CD 8/20.

▲† **Tidewater Constr. Co.**, 538 Front St., Norfolk, Va., Peter Kiewit Sons Co., 1024 Omaha National Bank Bldg., Omaha, Neb., and **Patterson, Emerson & Comstock, Inc.**, 313 E. Carson, Pittsburgh, Pa., CA Total est. **$60,000,000** constr. U. S. NAVAL RADIO OBSERVATORY, NBy-17809 SUGAR GROVE, W. VA., Fifth Naval Dist., Dpt. Navy, Norfolk, Va. Irving Bosman & Assocs., Davidson Bldg., Charleston, W. Va. archts. Grad-Urbahn-Seelye, 101 Park Ave., New York, N. Y., archts.-engrs. Awarded Sept. 19. CD 6/25.

▲ **Southeastern Constr. Co.**, 301 W. 2nd St., Charlotte, N. C., CA **$3,500,000,** WAREHOUSE and OFFICE, 301 W. 32 St., CHARLOTTE, N. C. Gates Rubber Co., 999 S. Broadway, Denver, Colo.

▲ **Wesley Constr. Co.**, 174 Alexander St. N. W., Atlanta, Ga., CA approx. **$2,000,000.** Moreland SHOPPING CENTER, ATLANTA, GA. Moreland Shopping Center, Inc., 575 Madison Ave., New York, N. Y. Bids July 18. CD 7/11.

▲ **Stewart-Berry Constr. Co.**, 510 Delannoy Ave., Cocoa, Fla., Owner Builds, **$2,000,000,** 200 RESIDENCES in Green Acres Estate, COCOA, FLA.

▲ **Joseph G. Moretti, Inc.**, 2401 NW 7 St., Miami, Fla., CA **$2,102,577** Patient's WING addn. to Central Bldg., Jackson Memorial Hospital, 1700 NW 17 Ave., MIAMI, FLA. Bd. Comrs. Dade Co., 10th Floor, Courthouse, Miami, Fla. Bids Aug. 26, awarded Sept. 9. CD 9/5, under LB.

▲ **Paraton Properties, Inc.**, 3530 S. Tamiami Trail, Sarasota, Fla., Separate Contracts, **$2,500,000,** 164 RESIDENCES, SARASOTA, FLA.

▲ **Robert Thibodeaux & Co.**, 2834 Greenwood Dr. and Box 887, Baton Rouge, La., CA **$1,897,000,** Scotlandville SENIOR HIGH SCHOOL, Scotlandville, BATON ROUGE, LA. East Baton Rouge Parish School Bd., 805 St. Louis St., Baton Rouge, La. Bids Sept. 11. CD 9/3.

▲ **Southern Builders, Inc.**, 491 W. 61 and Box 1815, Shreveport, La., CA **$1,384,000** Unit A-2 MEN'S DORMITORIES; Unit B-2 WOMEN'S DORMITORIES, GRAMBLING, LA. Louisiana State Bd. Educ., Grambling College, Grambling, La. Grand total, **$2,583,414.** Bids Sept. 4, awarded Sept. 10. CD 9/16, under LB;
Jesse F. Heard & Son, Box 3566, West Monroe, La., CA **$584,446** Unit C STUDENT UNION BLDG., (Grambling, La.);
Rannie Terral, Box 545, Farmerville, La., CA **$614,968** Unit D DINING HALL BLDG. (Grambling, La.).

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

October 8 Illinois — October 14 Wisconsin

STREETS AND ROADS

October 8 Illinois — October 14 Wisconsin

▲O., Gallipolis—BA 11/1—City, City Hall, sewage disposal plant and sewer expansion. $1,449,492. CD 11/9/54.

BUILDINGS—BA

▲ O., South Euclid—SCHOOL—BA 10/16—South Euclid-Lyndhurst Bd. Educ., 4777 Farnhurst Rd., Junior High School. $2,500,000. Plans deposit $50. Spahn & Barnes, 1950 Lee Rd., Cleveland, Zone 18, archts. CD 11/13.

▲† O., Brecksville — HOSPITAL — BA 11/4 — Veterans Admin., Munitions Bldg., Wash., D. C., 1,000 bed neuropsychiatric hospital. $20,500,000. CD 12/1/55.

HEAVY CONSTRUCTION—LB & CA

▲ OHIO—Dpt. Hys., Columbus, Zone 15, Bates & Rogers Constr. Corp., 600 W. Jackson Blvd., Chicago, Ill., CA $5,307,249, est. $6,136,800, imprv. 5.7 mi. section, Cincinnati-Conneaut Freeway (State Rt. 1) incl. 9 bridges, Proj. 378, Lake Co. Bids Sept. 3. CD 9/10, under LB.

▲ OHIO—Dpt. Hys., Columbus, Zone 15, National Engineering & Contg. Co., 1968 W. 3 St., Cleveland, O. CA $1,947,258, est. $2,635,800, twin bridges carrying Cincinnati-Conneaut Freeway over Grand River (State Rt. 1) Proj. 379, Lake Co. Bids Sept. 3. CD 9/10.

▲ Anthony Pontarelli & Sons, 315 W. Quincy St., Chicago, Ill., LB $1,710,820 (6 bidders) Calumet Intercepting Sewer, Contr. 19B, ext. A, adjacent to Calumet works, Markham-Bremer Twps., CHICAGO, ILL. Metropolitan Sanitary Dist. of Chicago, 100 E. Erie St., Chicago, Ill. CD 9/16, under LB.

▲ Dpt. Purchases, City of Chicago, City Hall, Zone 2, Chicago, Ill., rejected bids Aug. 28, auxiliary outlet sewers, Pratt Ave. Sys.; 48 in. rein.-con. pipe and concrete sewer, CHICAGO, ILL. LB $1,568,131. CD 9/3, under LB.

▲ WISCONSIN-MINNESOTA—State Hy. Dpt., 1246 University Ave., St. Paul, Minn., Industrial Constr. Co., 9216 Grand Ave., Minneapolis, Minn., CA $2,282,495, grade, sand-gravel sub-base, gravel base, concrete base, plant-mixed bit. base, 1 mi. in and near Red Wing, Minn., and Bridge No. 9040 over Mississippi River and Bridge No. 9103 (A Joint Minnesota-Wisconsin proj.), Goodhue Co., Minn. Bids Aug. 22, CD 8/26, under LB.

▲ WISCONSIN—State Hy. Comn., State Office Bldg., Madison, Wis.—J. R. Griffith Co., P. O. Box 58, Racine, Wis., CA $1,384,338, base, concrete pavement and structures, 2.661 mi. Illinois State Line-Milwaukee County Line (Illinois State Line-C.T.H. C Section) Road, I. H. 94, Contr. 1, Proj. I-94-6 (13) 345, Kenosha Co., Wis.—Harrison Engineering & Constr. Corp., 3706 Broadway, Kansas City 11, Mo., CA $1,438,599, c. conc. 9.725 mi. Hudson-Eau Claire (Woodville-Knapp Section) Road, I. H. 94, Contr. 1, Proj. I-94-1 (25) 23, St. Croix and Dunn Counties; Wis.—N. M. Isabella, Inc., 714 Market Place, Madison, Wis., CA $1,294,733, c. conc. 8.204 mi. Menomonie Relocation and Hudson-Eau Claire (Knapp-Menomonie Section), S. T. Hy. 25 and I. H. 94, Contr. 3 and 1, Projs. T 067 (7) and I-94-1 (27) 33, Dunn Co.; Wis.—Reliance Constr. Co., Div. of The C. Reiss Coal Co., Box 688, Sheboygan, Wis., CA $681,736, subbase, base, b. conc. 17.751 mi. Brothertown-Kaukauna and Sherwood-Kaukauna Roads, S. T. Hy. 55, Contr. 1, Projs. DS 0392 (6) and DS 03925, Calumet and Outagamie Counties, Grand Total $4,799,406. Bids Sept. 16. CD 9/22, under LB.

▲ WISCONSIN—State Hy. Comn., State Office Bldg., Madison Bonness Co., 10815 Watertown Plank Rd., Wauwatosa 13, Wis., CA $1,543,203, Structures B-40-49 and B-40-50, East-West Expressway (Stadium Interchange, East Bound and Westbound, Viaducts), I. H. 94, Contr. 1, Proj. IN-94-4 (17) 306, Milwaukee Co., Bids Sept. 16. CD 9/22, under LB.

▲† Great Lakes Dredge & Dock Co., Williamson Bldg., Cleveland, O., CA $3,297,484, removal 2,038,000 cu. yd. material from foot of Lake Huron, St. Clair River, MICHIGAN. U. S. Eng., 600 E. Jefferson St., Detroit, Mich., Bids Sept. 4, CD 8/19; Price Brothers-McClung, Inc., 1932 E. Monument, Dayton, O., CA $175,404, removal 141,000 cu. yd. material from depths of Middle Neebish Channel, St. Mary's River near Sault Ste. Marie (Michigan).

▲† Champion, Inc., P. O. Box 231, Iron Mountain, Mich. CA $1,684,744, dormitories and trailer court, incl. all related work at Kinross Air Force Base, ENG-20-064-59-4, KINROSS, MICH. U. S. Eng., 1101 Washington Blvd., Detroit, Mich. Bids Aug. 22. CD 8/12.

BUILDINGS—LB & CA

▲ A. Siegler & Sons, 5117 Lee Rd., Bedford, O. Own Forces, $1,250,000, 110 suite APARTMENT DE-

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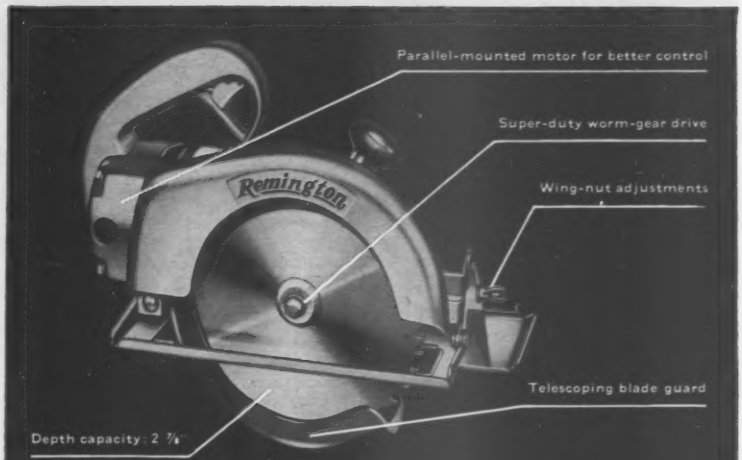
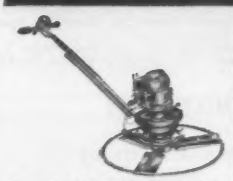
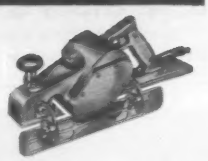


Circular Saw, Model 86—8½" blade cuts up to 2-5/16" at 45°. Powerful 12 amp motor plus worm gear drive develops tremendous torque. 4200 rpm; ball and needle bearings; wt. 18 lbs. Complete with blade, wrench, and carrying case. UL approved. Price: $148.00*



Power Trowel, Model TG4-26—2½-hp, 4-cycle, gasoline-powered engine; 26" ring size; automatic recoil starter; centrifugal clutch disengages at idle. Price $340.00.

Electric Drill, Model 125—½" capacity; 7-amp motor, most powerful in its class; 500 rpm; rugged construction yet light weight: 8½ lbs. Price $73.00*



Plane, Model 3P — Extra-heavy-duty, 3" combination door and surface plane—converts by removing fence; superb balance; 8.4-amp motor. Price: $170.00*

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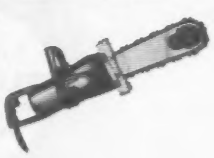

Electric Chain Saw, Model 11E12D—12-amp universal motor; hardened steel bevel gears; 12" bar with Roller Bearing nose; Wt.: 18 lbs. Price $120.00*

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VELOPMENT, Libby Rd., BEDFORD HEIGHTS, O. Marvin J. Rukin, 13947 Cedar Rd., Cleveland 18, O., archt. CD 3/24.

▲ **Aetna-Standard Engineering Co.**, Frick Bldg., Pittsburgh, Pa., CA Est. **$3,000,000**, hot mill machinery continuous butt-weld PIPE MILL. LORAIN, O. National Tube Division, U. S. Steel Corp., 71 Broadway, New York 6, N. Y. CD 5/1/56.

▲ **E. L. Tresdell & Assoc.**, 1511 Yale Ave., Arlington Heights, Ill. Own Forces **$1,275,000**, 90 HOMES, Yale and Lynnewood Aves., ARLINGTON HEIGHTS, ILL.

▲ **Concannon Builders**, 208 Washington St., Naperville, Ill., Own Forces **$3,780,000**, 160 HOMES, Heathercrest and Blackhawk Subdivisions, AURORA, ILL.

▲ **Comet Constr. Co.**, 1848 N. Milwaukee Ave., Chicago, Ill., CA **$3,750,000**, 250 HOMES, BUFFALO GROVE, ILL. Horatio Garden Corp., c/o general contractor.

▲ **Crane Constr. Co.**, 201 E. Walton St., Chicago, Ill. LB **$5,500,000**, 38 story, APARTMENT, 1550 Lake Shore Dr., CHICAGO, ILL. J. J. Mack & Ray Sher, 201 E. Walton St., Chicago 11, Ill. Shaw, Metz & Dolio, 208 S. LaSalle St., Chicago, Ill., archts. CD 7/3/53.

▲ **Dunbar Builders Corp.**, 2637 W. Peterson Ave., Chicago, Ill. Own Forces **$2,250,000**, CO-OPERATIVE APARTMENT, SHOPPING, MEDICAL AND OFFICE CENTER, Kedzie St. between Devon and Rosemont Aves. West Rogers Park, CHICAGO, ILL. Ernest M. Mandel, 6410 N. Fairfield Ave., Chicago, Ill., archt.

▲ **Mercury Builders**, 761 S. Harlem Ave., Forest Park, Ill, CA **$2,061,039**, general contract 3 MOTOR VEHICLE BLDGS., North, West and South Rt. superhighways, CHICAGO, ILL. State of Illinois, Chas. F. Carpentier, secy., 188 W. Randolph St., Chicago 1, Ill. CD 8/22, under LB.

▲ **S. M. Wilson & Co.**, 1616 Cleveland Ave., Granite City, Ill. LB **$1,387,538** (4 bidders) general contract 6 story, brick, steel, concrete etc. HOSPITAL WING addn., GRANITE CITY, ILL. St. Elizabeth's Hospital, Sisters of Divine Providence, 2100 Madison Ave., Granite City, Ill. Bids Sept. 17. CD 9/12.
Ideal Heating Co., 6316 Wentworth Ave., Chicago, Ill. LB **$396,380**, heating ventilating and air conditioning work. (Granite City, Ill.)

▲ **Allis Chalmers Mfg. Co.**, 1126 S. 70th St., Milwaukee, Wis., CA (1st unit) 265,000 kw turbine-generator, Port Sheldon Plant on Lake Michigan, MICHIGAN. Consumers Power Co., Consumers Power Bldg., Jackson, Mich.;
Combustion Engineering, Inc., 91 West Main St., Chattanooga, Tenn. CA 13 story BOILER PLANT (Michigan).

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES
October 9 Kansas — October 14, 15 Texas
October 28 South Dakota

STREETS AND ROADS
October 9 Kansas — October 10 Minnesota
October 14, 15 Texas — October 28 South Dakota

▲† **Montana**—BA 11/20—U. S. Eng., Garrison, Riverdale, N. D., constr. powerhouse and switchyard for Fort Peck Second Power plant, 20 mi. SE of Glasgow in Twp. 26 N. R. 41 E., McCone Co. ENG-32-015-59-4. CD 7/24.

BUILDINGS—BA

▲ **Colo., Denver**—SCHOOL—BA 10/15—School Dist. No. 1, 414 14th St., 1, 2 and 3 story, 65 classrooms, 256,404 sq. ft. Thomas Jefferson Junior-Senior High School. Approx. $2,500,000. Extended date. Smith & Hegner, 1659 Grant, archt. CD 9/18.

▲ **Mo., Webster Groves (St. Louis 19, P. O.)**—SCHOOLS—BA 10/21—School Dist. Bd. Educ., 16 Selma Ave., Webster Groves, Zone 19, 2 story Junior High School, Lockwood and Plymouth Aves. $1,430,000; 1 and 2 story campus style Junior High School, Brownburt Lane and Rock Hill Rd. $1,625,000. Hellmuth, Obata & Kassabaun, Inc., 315 N. 10th St., St. Louis, Zone 1, archts CD 5/14.

BUILDINGS—SLC

▲ **Mo., St. Louis**—DAVID P. WOHL, JR. MEMORIAL—Washington University, Lindell and Skinker Blvds., Zone 5, soon lets contract 8 story, ground and subfloors, 64,800 sq. ft. David P. Wohl, Junior Memorial, Audubon between Euclid and Kingshighway. $2,050,000. CD 8/26.

HEAVY CONSTRUCTION—LB & CA

▲ **MINNESOTA**—State Hy. Dpt., 1246 University Ave., St. Paul. Bids opened 9/19,
Minn.—A. Johnson Constr. Co., Fosnay Tower, Minneapolis, Minn., LB **$1,109,659**. (7 bidders), constr. Bridge No. 9295, 84-87-87-87-87-121-178-178-103 ft. continuous beam and plate girder spans, over Minnesota River at LeSueur, Sibley and LeSueur Counties; LB **$176,925**. (14 bidders), Bridge No. 9297 over connection Road and overhead C.&N.W. Railway, LeSueur Village, LeSueur Co.;

Minn.—Arrowhead Engrs. & Constructors, Inc., 1122 West Railroad St., Duluth, Minn., LB **$96,930**. (8 bidders), Bridge No. 9530, highway separation TH 53 under TH 216, 4.8 mi. south of Eveleth, St. Louis. CD 9/4.

▲ **Tankersly Constr. Co.**, First National Bldg., Oklahoma City, Okla., CA est. **$3,000,000**. cost plus, 2 hangars and parking areas at Will Rogers Field Airport Trust, OKLAHOMA CITY, OKLA. Oklahoma City Airport Trust, First National Bldg., Oklahoma City, Okla. Awarded Sept. 17. CD 8/6.

▲† **U. S. Eng.**, Box 61, Tulsa, Okla., rejected bids Aug. 28, airmen's dormitories and dining hall, Tinker Air Force Base. ENG-34-066-59-2, OKLAHOMA CITY, OKLA. New bids Sept. 19. LB **$1,615,619**. CD 9/4, under LB.

▲ **TEXAS**—State Hy. Comn., Austin, Bids opened 9/17,
Tex.—Cage Bros., 6959 San Pedro St., San Antonio, Tex. LB **$740,849**, grade, etc. 11.684 mi. Hy. SH 71. Proj. DF 779 (5) Colorado Co; LB **$3,148,103**, grade, etc. 1.525 mi. Hy. IH 45. Proj. I 45-1 (14) 52. IH 45, Harris Co.;
Tex.—John L. Nelson, Shreveport, La. LB **$2,094,190**, frontal road, etc. 4.847 mi. Hy. IH 20. Proj. I 20-5 (8) 468 & I. 30-1 (5) 000 Dallas Co.;
Tex.—Gilvin-Terrill, Inc., Box 2268, Amarillo, Tex. LB **$649,364**, grade, etc. 12.778 mi. Hy. US 87. Proj. F 613 (14) Lynn Co.;
Tex.—A&A Contractors, Inc., 601, Olney, Tex. LB **$632,065**, grade, etc. 17.177 mi. Hy. SH 92 Proj. S 161 (2) Jones Co.;
Tex.—Brown & Root, Inc. and San Jacinto Equipment Co., Box 3, Houston, Tex. LB **$1,769,337**, grade, etc. 5.315 mi. Hy. US 59. Proj. F 514 (23) Harris Co.;
Tex.—J. M. Dellinger, Inc., P. O. Box 4227, Corpus Christi, Tex. LB **$438,997**, flex. base, etc. 24.316 mi. Hy. SH 9. Proj. DF 789 (8) Live Oak Co.;
Tex.—Trinity Constr. Co., Inc., P. O. Box 3024, Houston, Tex. LB **$560,649**. grade, etc. 6.321 mi. Hy. SH 288 Proj. DU 565 (4) DU 393 (4) DF 318 (3) Harris and Fort Bend Counties. CD 9/11.

▲ **TEXAS**—State Hy. Comn., Austin. Bids opened 9/16,
Trinity Builders, Elmer C. Gardner, P. O. Box 3024, Houston, Tex. LB **$2,732,309**. grade, etc. 1.381 mi. Hy. IH 10, Proj. I 10-7 (13) 785, Harris Co. CD 9/5.

▲† **Fairbanks-Morse & Co.**, 902 Harney St., Omaha, Neb., CA **$2,151,060**, 6 generators, Squadron 1, Francis E. Warren Air Force Base, ENG-25-066-59-4, CHEYENNE, WYO. U. S. Eng., 1709 Jackson St., Omaha 2, Neb. Bids Aug. 7, awarded Sept. 12. CD 8/29, under LB.

BUILDINGS—LB & CA

▲ **Betchel Corp.**, 220 Bush, San Francisco, Calif., CA Est. **$14,000,000**, 125,000 kw addn. to Cameron Bluff GENERATING STATION, 3 mi. northwest of LAWRENCE, KAN. Kansas Power & Light Co., 800 Kansas, Topeka, Kan.

▲ **Imwood Constr. Co.**, Trinity Universal Bldg., Dallas, Tex. CA **$1,700,000**. general constr. on all 3 bldgs. only, WOMEN'S DORMITORY, MEN'S DORMITORY, MARRIED STUDENTS DORMITORY-APARTMENT, DALLAS, TEX. Southern Methodist University, Campus, Dallas, Tex. Bids Aug. 28. CD 9/11, under LB.

▲ **A. P. Kasch & Sons**, Box 1472, Big Spring, Tex. CA **$1,363,110**, ELEMENTARY SCHOOL, HIGH SCHOOL UNIT, BUS GARAGE, ADMIN. BLDG., KERMIT, TEX. Kermit Ind. School Dist., Kermit, Tex. Bids Sept. 4. CD 8/6.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES
October 7 Washington — October 22 California

STREETS AND ROADS
October 7 Nevada, Washington October 22, 23 California

▲† **California**—BA About 10/30—U. S. Eng., 180 New Montgomery St., San Francisco, harbor imprvs. Half Moon Bay in vicinity of Princeton, San Mateo Co., ENG-04-203-59-53. CD 9/23.

BUILDINGS—BA

▲ **Calif., Fontana**—SCHOOL—BA 10/7—Fontana Unif. School Dist., constr. Alder Junior High School. $1,676,937. Balch, Bryan, Perkins & Hutchason, 2933 Rowena Ave., Los Angeles, archts. CD 6/16.

▲ **Calif., Los Angeles**—MECHANICAL WORK—BA 10/22—State Div. Architecture, 1100 S. Grand Ave., mechanical work for 9 story state office bldg. and 7 story parking garage, W. O. 3848GC-3 and W. O. 4001GC-7 $2,118,000. Plans deposit $100. Bids Aug. 27 rejected, LB **$1,846,300**. CD 9/4, under LB.

▲ **Calif., Fresno** — OFFICE — BA 10/28 — State Div. Architecture, 1120 N. St., Sacramento, 5 story, 158,000 sq. ft. floor space state office bldg. and adjoining 2 story rein.-con. about 45,000 sq. ft. floor space parking facility, W. O. 3848GC-4. $3,069,000. Plans deposit $100. CD 1/7/57.

HEAVY CONSTRUCTION—LB & CA

▲† **IDAHO**—Bureau P. Rds., Dpt. Commerce, Boise, Bids opened 9/18,
MacGregor-Triangle Co., 200 Sunrise Rim, Boise, Idaho, LB **$1,300,568**, est. $1,407,227, (12 bidders), clearing, grubbing, grading, draining and constr. 75 ft. rein.-con. bridge on 12.742 mi. Lewis and Clark Hy. in Clearwater and Lolo National Forests, Idaho Public Lands, Proj. FL 16(3) and Forest Hy. Proj. 16-M, Idaho Co., CD 9/4.

▲ **Western Contg. Co.**, 400 Benson Bldg., Sioux City, Iowa. CA Est. **$5,000,000**, mine stripping, BINGHAM,

UTAH. Utah Copper Div., Kennecott Copper Corp., Kearns Bldg., Salt Lake City, Utah.

▲ **NEVADA**—State Dpt., Hys., State Hy. Bldg., Carson City,
Wells Cargo, Inc., Las Vegas, Nev. CA **$1,328,985** (8 bidders) constr. portion Int. Hy. Sys. 4.1 mi. Int. Hy. 15 (US 91) between California-Nevada State Line and 4.1 mi. SW of Jean (incl. connection in Calif.) Rte. section 015-1 control section CL-81. Proj. I-015-1 (8) State Hy. Contr. 1041 Clark Co. Bids Sept. 18. CD 9/4.

▲ **WASHINGTON**—State Hy. Comn., Ernest J. Ketcham, chn. Dt. Hys., Olympia,
Wash.—**Northwest Constr. Co.**, 3950 6 Ave. N.W., Seattle, Wash., CA **$1,797,426** (5 bidders), grading, surf. constr. cement-treated base and bit. surf. treatment, paving with c. conc. and b. conc. and fencing 5.029 mi. Primary State Hy. 1, Ponders to S. 72 St. in Tacoma, FAP No. I-5-3 (31) 125, Pierce Co.;
Wash.—**Osberg Constr. Co.**, 1128 N. 128 St., Seattle 33, Wash., CA **$1,069,759** (3 bidders) grading, surf. with special ballast and fencing 5.722 mi. Secondary State Hy. 13-A, Cedar River to North River, FAS No. S-0453 (7), Pacific Co. Bids Sept. 16, awarded Sept. 17. CD 9/10, under LB.

▲† **Guy F. Atkinson**, 10 W. Orange Ave., South San Francisco, Calif., LB **$7,360,599**, est. $6,265,905, powerhouse, Ice Harbor Dam, WASHINGTON, U.S. Eng., City-County Airport, Walla Walla, Wash. Bids Sept. 18. CD 7/17.

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles,
Ukropina-Polich & Kral, P. O. Box 105, San Gabriel, Calif. CA **$2,445,261**. grade, pave to constr. 2.6 mi. 6 lane freeway Riverside Freeway (SR 14) between 0.4 mi. west of Spadra Rd. and 0.1 mi. east of Placentia Ave. incl. structures, Orange Co. Bids Aug. 28, awarded Sept. 22. CD 9/3, under LB.

▲ **CALIFORNIA**—State Div. Hys., 1120 N. St., Sacramento, Bids opened 9/24,
Griffith Co., 1060 S. Broadway, Los Angeles 15, Calif., LB **$3,226,189** (11 bidders) 4 lane freeway 7.7 mi. U. S. Hy. 99 from 0.4 mi. south of Clinton Ave. to just north of Herndon Incl. 7 structures, Fresno and Madera Counties. CD 8/28.

▲ **Macco Corp.**, 14409 S. Paramount Blvd., Paramount, Calif. CA **$1,582,379**, Proj. 19, Hollydale "A" South Gate, Paramount and Downey, LOS ANGELES, CALIF. Los Angeles Co. Flood Control Dist., 2250 Alcazar St., Los Angeles, Calif. Bids July 25. CD 7/30, under LB.

▲† **Guy F. Atkinson Co.**, 10 W. Orange Ave., South San Francisco, Calif. CA **$6,480,768** constr. Success Dam on Tule River, Tulare Co., involving earth-rock fill dam, 3,500 ft. long, 140 ft. high, earth fill dike, 7,690 ft. long and 40 ft. high, 1,340,000 cu. yd. unclassified excav., 6,050,000 cu. yd. borrow excav, 1,097,000 cu. yd. impervious compacted fill, 850,000 lb. reinforcing, steel, Spec. 2280A, Eng-04-167-59-8, CALIFORNIA, U. S. Eng. 1209 8th St., Sacramento, Calif. Bids Sept. 11, awarded Sept. 17. CD 9/15, under LB.

▲ **CALIFORNIA**—State Div. Hy., 120 S. Spring St., Los Angeles,
Daley Corp., Mission Valley at Ward Rd., San Diego, Calif. CA **$1,956,609.**, grade, pave, 2 mi. 8 lane freeway State Sign Rte. 94, between 24th St. and Home Ave., in San Diego, and constr. 265 ft. bridge to carry 25th St. over freeway, San Diego Co. Bids Aug. 28, awarded Sept. 16. CD 9/3 under LB.

▲ **CALIFORNIA**—State Div. Hys., 1120 N. St., Sacramento, bids opned 9/17,
Gordon H. Ball, Gordon H. Ball Inc. Ball & Simpson and Lew Jones Constr. Co., 685 Delaware St., Berkeley, Calif. LB **$2,959,006** (9 bidders) (joint venture) grading, paving to constr. 2.5 mi. 4 lane freeway and 7 structures, State Sign Rte 17 between Bascom Ave. and N. 4th St., in San Jose, IV-SC1-5-SJS, D, Santa Clara Co. CD 8/13.

BUILDINGS—LB & CA

▲ **Newland Constr. Co.**, 2626 Rockerfeller, Everett, LB **$1,615,454** (10 bidders) SCIENCE BLDG., BELLINGHAM, WASH. Western Wash. College of Educ., Bellingham, Wash. Bids Sept. 19. CD 8/12.
Diamond B. Pad H. Co., 915 Bellingham, Wash., LB **$464,000**, (2 bidders) mechanical work SCIENCE BLDG., (Bellingham Wash.).

▲ **J. H. Sellen Constr. Co.**, 228 9 Ave. N., Seattle, Wash., CA Est. **$1,800,000**, 6 story, 82 x 108 ft., rein.-con. FERMENTING CELLAR BLDG., with 29 steel-lined tanks, SEATTLE, WASH. Sicks' Rainier Brewing Co., 3100 Airport Way, Seattle, Wash. CD 10/21/55.

▲ **Merco, Inc.**, 6052 W. Venice Blvd., Los Angeles, Calif., CA **$1,528,000**, Cleveland HIGH SCHOOL, Phase 3, Roscoe and Vanalden Sts., LOS ANGELES, CALIF. Bd. Educ., 1425 S. San Pedro St., Los Angeles, Calif. Matcham & Grainger, 1258 W. 1st St., Los Angeles, Calif., archts. Bids Aug. 27. CD 6/9/58.

▲ **Contractors, Inc.**, 1101 N.E. 21 Ave., Portland, Ore. CA **$1,353,334**, HIGH SCHOOL, GRESHAM, ORE. Gresham School Dist., Gresham, Ore. Awarded Sept. 19. CD 9/22, under LB.

▲ **Everett Brunzell Corp.**, 3945 Higuera St., Culver City, Calif., LB **$2,249,970**, (7 bidders), constr. Richard E. Byrd JUNIOR HIGH SCHOOL, Sun Valley, LOS ANGELES, CALIF. Bd. Educ., 1425 S. San Pedro St., Los Angeles, Calif. Bids Sept. 18. CD 8/5/57.

▲ **Twaits-Wittenberg Co.**, 507 S. Bixel St., Los Angeles, Calif. CA **$2,618,000**, general constr. two 3 story each 70,000 sq. ft. floor area and 1 with 23,700 sq. ft. bsmnt., SCIENCE CLASSROOM bldgs., San Fernando Valley State College, W.O. 4005GC-59, LOS ANGELES, CALIF. State Div. Architecture, 1100 S. Grand Ave., Los Angeles, Calif. Bids Sept. 11, awarded Sept. 17. CD 9/18, under LB;
George Kauffman, 5050 Vineland Ave., North Hollywood, Calif. CA **$565,678**, mechanical work (Los Angeles, Calif.).

▲ **Pacific Coast Builders**, 1 S. Park St., San Francisco, Calif., CA **$3,040,000**, 2 story, 160,000 sq. ft. prestressed concrete roof, rein.-con. Pacific HIGH SCHOOL, SAN LEANDRO, CALIF. San Leandro Unified School Dist., 451 W. Joaquin St., San Leandro, Calif. Awarded Sept. 16. CD 8/27, under LB.

CANADA

BUILDINGS—BA

▲ **Ont., Ottawa**—OFFICE—BA 10/8—Dpt. P. Wks., Hunter Bldg., 9 story, penthouse, 75x266 ft., 2 story, 74x337 ft. and 1 story, 146x146 ft. rein.-con. fdns. and frame, brick faced walls etc. administration office bldgs. connected with common bsmnt., $2,000,000. Shore & Moffat, 51 Wellington St. W., Toronto, archts. CD 12/5/56.

▲ **Que., Montreal**—RECREATION CENTER—BA 10/22—City, City Hall, 2 and 3 story, bsmnt. Recreation Center, Bellechasse St. $1,750,000. Plans deposit $500. David & David, 7020 Cote des Neiges Rd., archts. Brouillet & Carmel, 3600 Barclay Ave., engrs. CD 10/17/56.

BUILDINGS—LB & CA

▲ **Burns & Dutton Concrete Constr. Co. Ltd.**, 563 W. Broadway, Vancouver, B. C. CA **$1,318,800**, rein.-con. undergraduate wing, CHEMISTRY BLDG, addn., VANCOUVER, B. C. University of B. C., Campus, Vancouver, B. C. Thompson, Berwick & Pratt, 1553 Robson St., Vancouver, B. C., archts. Awarded Sept. 15. CD 8/12, under LB.

▲ **Anglin-Norcross Ontario Ltd.**, 224 Davenport Rd., Toronto, Ont., CA **$1,500,000** (8 bidders) 5 story, 50 x 150 ft., brick facing, rein.-con. frame HOSPITAL addn., poured concrete fdns., incl. 50x50 ft. projecting wing, TORONTO, ONT. Scarsborough General Hospital, Lawrence Ave. E. and McGowan's Rd., Toronto, Ont. Bids Aug. 28, awarded Sept. 11. CD 8/19.

▲ **Louis Donolo (Ontario) Ltd.**, 2790 Dufferin St., Toronto, Ont. LB **$4,452,487** (15 bidders) 10 story, rein.-con. frame POST OFFICE addn., poured concrete fdn., St. Clair Ave. and Yonge St., TORONTO, ONT. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. Bids Sept. 10. CD 8/5.

▲ **Salem Engineering Co., Ltd.**, 1525 Bloor St. W., Toronto 9, Ont., CA Est. **$15,000,000**, 100,000 tons

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PUERTO RICO

BUILDINGS—LB & CA

▲ **Mirmar Hotel Corp.**, J. J. Otero, Fernandes Juncos and Figueroa Sts., Santurce, Puerto Rico, Own Forces, $3,000,000, HOTEL, with swimming pool, Ponce de Leon Ave., SAN JUAN, PUERTO RICO. Angel Aviles, 5 Yardley Place, San Juan, Purto Rico, archt.

LATIN AMERICA

HEAVY CONSTRUCTION—BA

▲ **Brazil**—BA 10/15—Central Eletrica de Furnas S/A (FURNAS) Rua Sao Jose 90-3° andar, Rio de Janeiro, manufacture and delivery synchronous generators, designed for coupling to vertical Francis hydraulic turbines, for hydro electric development on Rio Grande, near town of Passos, Minas Geraiis. CD 6/13.

AMERICANS ABROAD

BUILDINGS—BA

▲† **Panama Canal Zone**—HOUSING—BA 11/4—U. S. Eng., Box 4960, Jacksonville, Fla., U. S. A., constr. 330 units, 1 and 2 story duplexes CB slump brick Capehart family housing, sewers, water, elec., paving, walks, etc., Panama Canal Zone (Pacific Side) at Fort Amador 30 units, Ft. Clayton 130 units, Quarry Heights, 16 units, Corozal 54 units, Curumder 100 units, ENG-08-123-59-7. $5,424,852. Joseph H. Brysdn, 111 West Adams St., Jacksonville, Fla., U. S. A., engr.-archts. CD 9/16.

PROPOSED PROJECTS

WATER SUPPLY

▲ **Ark., Fort Smith**—City, City Comrs., City Hall, expansion city water filter plant, $2,000,000. Smith, Russell & Grayson, First National Bank Bldg., Stuttgart, consult. engrs. CD 9/10/54.

▲ **Mo., Gladstone**—Clay County Water Dist. No. 1, Box 128, Gladstone, defeated bonds Sept. 9, WW imprvs. $1,035,000. CD 9/4.

▲ **Tex., Wichita Falls** — City, water filtration plant. $2,700,000.

SEWERS, WASTE DISPOSAL

▲ **Ill., Chicago**—Dpt. Purchases, City Hall, plans by Paul Gerhardt, Jr., City Hall, Zone 2, incinerator, Narragansett and Grand Aves., $2,500,000. CD 6/10/57.

▲ **La., Bogalusa** — City, City Hall, (La. 16-P-3035) constr. sewer facilities. $1,400,000. Application filed with HHFA for advance. Burk, LeBreton & Lamantia, 632 Pirates Alley, New Orleans, La., consult. engrs.

▲ **Wash., Montlake Terrace** — City, City Hall, voted $150,000 bonds Sept. 9, sanitary sewerage sys., $1,500,000. CD 7/29.

BRIDGES

▲ **Ill., Chicago**—Dpt. Purchases, City of Chicago, City Hall, Zone 2, steel section and concrete deck bridge, Incl. 6 lanes, Fullerton Ave. and River St., $1,700,000, Bids near future; rehabilitation of Pulaski Rd. bridge, redeck with open steel grating, rehab. steel work 4 lanes, Pulaski Rd. and Sanitary Canal, $325,000, Bids about December. Steve Michuda, 320 N. Clark St., Zone 11, engr. CD 6/10/57.

▲ **Ore., Portland**—Multnomah Co., Court House, bond election Nov. 4, Ross Island Bridge, $7,000,000. CD 2/17/54.

EARTHWORK, WATERWAYS

▲† **Alabama**—U. S. Eng., P. O. Box 1169, Mobile 7, Ala., Jackson Lock and Dam, Tombigbee River, near Coffeeville, $6,000,000 appropriated.

▲† **Alabama-Georgia**—U. S. Eng., Grant St., Mobile, Ala., Walter F. George (Fort Gaines) lock and dam, Chattachoochee River, $11,700,000 appropriated. CD 10/17/55.

▲† **Arkansas**—U. S. Eng., 300 Broadway, Little Rock, Dardanelle lock and dam, Arkansas River, $2,500,000 appropriated. CD 9/5/57.

▲† **Arkansas**—U. S. Eng., P. O. Box 867, Little Rock, Greers Ferry Reservoir, Little Red River, near Heber Springs, $4,000,000 appropriated.

▲† **California**—Aqua Buena Soil Conservation Dist., Vista, watershed protection, 8,970 acres, Buena Vista Creek watershed, San Diego Co., for Soil Conservation Service, Dpt. Agriculture, $1,698,400.

▲† **California**—Santa Rosa Soil Conservation, Sonoma County Flood Control and Water Conservation Dist., Santa Rosa, watershed protection, 50,000 acres, Central Sonoma watershed, Sonoma Co., for Soil Conservation Service Dpt. Agriculture, $11,826,400.

▲ **Calif., Escondido**—City, City Hall, $1,550,000 bond election Nov. 4, drainage and flood control projects.

▲† **Connecticut**—U. S. Eng., 150 Causeway St., Boston, Mass. Thomaston Reservoir, Housatonic River, $5,000,000 appropriated. CD 9/9/57.

▲† **Delaware and Maryland**—U. S. Eng., 2635 Abbottsford Rd., Phila., Pa., Inland Waterway, Delaware River to Chesapeake Bay, Summit Bridge. $2,940,000.

▲† **Delaware**—State Soil Conservation Comn., 313 S. Governers Ave., Dover, 119,775 acre watershed protection, Upper Manticoke River watershed, for Soil Conservation Service, Dpt. Agriculture. $4,817,010.

▲† **Georgia and South Carolina**—U. S. Eng., 200 East St. Julian St., Savannah, Ga., Hartwell Reservoir, $15,500,000 appropriated. CD 9/19/55.

▲† **Indiana**—Sullivan Co. Soil Conservation Dist., Farmersburg, Vigo Co. Soil Conservation Dist., Terre Haute, Greene Co. Soil Conservation Dist., Bloomfield, and Clay Co. Soil Conservation Dist., Brazil, 153,280 acres watershed protection for Busseron for Soil Conservation Service, Dpt. Agriculture. $3,326,260.

▲† **Indiana**—U. S. Eng., P. O. Box 59, 830 W. Broadway, Louisville 1, Ky., Mansfield Reservoir on Racoon Creek, near Rockville, $3,400,000 appropriated.

▲† **Iowa**—U. S. Eng., Clock Tower Bldg., Rock Island, Ill., flood control, Little Sioux River, $2,700,000 appropriated. CD 9/9/57.

▲† **Kansas**—U. S. Eng., 911 Walnut St., Kansas City 6, Mo., flood control near Topeka. $2,700,000 appropriated.

▲† **Kansas**—U. S. Eng., Box 61, Tulsa, Okla., Toronto Reservoir. $2,400,000 appropriated. CD 9/6.

▲† **Kansas**—U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo., Tuttle Creek Reservoir. $15,400,000 appropriated

▲† **Kentucky**—Butler Co. Soil Conservation Dist., Morgantown, Ky., North Logan County Soil Conservation Dist. and Soil Conservation Dist., Russellville, Ky., Muhlenberg County Soil Conservation Dist., Central City, Ky., Todd County Soil Conservation Dist. and Mud River Watershed Conservancy Dist., Elkton, Ky., watershed protection 240,033 acres Mud River Watershed, Todd, Butler, Logan and Muhlenberg for Soil Conservation Service, Dpt. Agriculture. $5,143,525.

▲† **Kentucky**—Caldwell County Soil Conservation Dist., Donaldson Creek Watershed Conservancy Dist., Princeton, Ky., watershed protection, 47,010 acres Donaldson Creek watershed, Caldwell and Crittenden Counties for Soil Conservation Service, Dpt. Agriculture. $1,940,696.

▲† **Kentucky**—Hickman County Soil Conservation Dist., Clinton, Ky., Graves County Soil Conservation Dist., Mayfield, Ky., Carlisle County Soil Conservation Dist., Hardwell, Ky., Fulton County Soil Conservation Dist. and Obion Creek Watershed Conservancy Dist., Fulton, Ky., watershed protection, 206,108 acres, Obion Creek Watershed, Hickman, Graves, Carlisle and Fulton Counties for Soil Conservation Service, Dpt. Agriculture. $3,975,016.

▲† **Kentucky**—U. S. Eng., 237 Fourth Ave., Huntington 18, W. Va., Fishtrap Reservoir; Levisa Fork, Big Sandy River. Total $24,000,000. ($140,000 appropriated for planning.

▲† **Michigan**—U. S. Eng., 1101 Washington Blvd., Detroit, Mich., Imprv. south canal, St. Mary's River. $2,000,000 appropriated.

▲† **Michigan**—U. S. Eng., 1101 Washington Blvd., Detroit, Mich., flood control, Battle Creek. $1,200,000 appropriated. CD 3/8/54.

▲† **Minnesota**—U. S. Eng., 1217 U. S. Post Office & Custom House, St. Paul, Zone 1, St. Anthony's Falls Lock and dam, Mississippi River, near Minneapolis. $1,100,000 appropriated.

▲† **Mississippi and Tennessee**—Muddy Creek Drainage Dist., Northeast Miss. Soil Conservation Dist., Ripley, Miss., Muddy Creek Watershed Dist., Tenn. and Hardeman Co. Soil Conservation Dist., Bolivar, Tenn., watershed protection 80,795 acres, Muddy Creek (Tenn.) watershed Tippah, Miss. and Hardeman, Tenn., for Soil Conservation Service, Dpt. Agriculture. $3,060,210.

▲† **Missouri and Arkansas**—U. S. Eng., P. O. Box 867, Little Rock, Ark., Table Rock Reservoir-White River, near Branson, Mo. $12,400,000 appropriated. CD 9/5.

▲† **Montana**—U. S. Eng., Riverdale, N. D., 2nd power house, Fort Peck Dam, Missouri River, near Nashua. $6,500,000 appropriated.

▲† **New Mexico**—U. S. Eng., P. O. Box 1538, Albuquerque, Abiquiu Reservoir, Rio Chama, $1,250,000 appropriated. CD 9/5/57.

▲† **North Dakota**—U. S. Eng., Riverdale, Garrison Reservoir, Missouri River, near Riverdale, $10,600,000 appropriated. CD 9/9/57.

▲† **Ohio and Kentucky**—U. S. Eng., 237 4th Ave., Huntington 18, W. Va., New Richmond locks and dams, Ohio River. $4,000,000 appropriated.

▲† **Oklahoma**—U. S. Eng., Box 61, Tulsa, Eufaula Reservoir, on Canadian River, near Eufaula. $7,500,000 appropriated. CD 9/5/57.

▲† **Oklahoma**—U. S. Eng., Box 61, Tulsa, Oologah Reservoir, Verdigris River, Arkansas River Basin, $10,000,000 appropriated. CD 9/5.

▲ **Oklahoma**—U. S. Eng., Box 61, Tulsa, Keystone Reservoir, Arkansas River, $8,500,000 appropriated. CD 9/5/57.

▲ **Oklahoma**—Whitegrass-Waterhole Water & Soil Conservancy Dist., Vallian SCS, Valiant, Okla., Little River, SCS, Idabel, Okla., watershed protection, 29,575 acres, Whitegrass-Waterhole Creek watershed, McCurtain Co. for Soil Conservation Serv., Dpt. Agriculture. $1,274,404.

▲† **Oregon and Washington**—U. S. Eng., 628 Pittock Block Portland, Wash., The Dalles Dam, $13,500,000 appropriated. CD 9/17/56.

▲† **Oregon and Washington**—U. S. Eng., City County Airport, Wall Walla, Wash., John Day lock and dam. $8,000,000 appropriated.

▲† **Pennsylvania and New Jersey**—U. S. Eng., Federal Bldg., Pittsburgh, Pa. dredging Delaware River (Phila. Naval Base to Trenton) $13,000,000 appropriated.

▲† **Pennsylvania and Ohio**—U. S. Eng., New Federal Bldg., Pittsburgh, Pa. Shenango River Reservoir. Beaver River Basin. Total cost $16,000,000. $100,000 appropriated. CD 6/9/44.

▲† **Pennsylvania**—U. S. Eng., New Federal Bldg., Pittsburgh, Dam 8, Monongahela River, Point Marion, $2,000,000 appropriated.

▲† **Pennsylvania**—U. S. Eng., 24th and Maryland Ave., Baltimore, Md., Stillwater Reservoir, Lackawanna River near Forest City. $1,300,000 appropriated.

▲† **Pennsylvania**—U. S. Eng., 2635 Abbottsford Rd., Phila., Dyberry Reservoir. $1,400,000 appropriated.

▲† **Pennsylvania**—U. S. Eng., 2635 Abbottsford Rd., Phila., Bear Creek Reservoir, Lehigh River. $1,740,000 appropriated. CD 9/11/57.

▲† **Pennsylvania**—U. S. Eng., 2635 Abbotsford Rd., Phila., Prompton Reservoir, Lackawaxen River, $1,100,000 appropriated.

▲† **Texas**—U. S. Eng., 100 W. Vickery St., Fort Worth, McGee Bend Dam $4,500,000 appropriated.

▲† **Texas and Oklahoma**—U. S. Eng., Box 61, Tulsa 2, Okla., highway bridge at Willis Ferry Site, Denison Reservoir, Red River near Denison. $1,000,000 appropriated.

▲† **Washington**—U. S. Eng., Bldg. 602, City-County Airport, Walla Walla, Ice Harbor lock and dam, $22,500,000 appropriated.

▲† **Washington**—U. S. Eng., 4735 E. Marginal Way, Seattle, Zone 4, Chief Joseph Dam on Columbia River, near Bridgeport, $2,400,000 appropriated.

▲ **Quebec**—Provincial Dpt. Agriculture, Parliament Bldgs., Quebec City, land drainage, 10 mile area, 14 ft. deep, 80 ft. wide, Vaudreuil, $1,000,000. CD 2/3/48.

AIRPORTS

▲ **Fla., Tampa**—OPERATIONAL FACILITIES, etc.—U. S. Eng., P. O. Box 4970, Jacksonville, operational and training supply facilities, and utilities MacDill Air Force Base. $3,577,000. CD 1/24/56.

▲† **Md., Patuxent River**—OPERATIONAL FACILITIES, etc.—Dist. P. Wks., Officer in Charge of Constr., Potomac River Naval Command, Naval Gun Factory, Wash., D. C., operational training facilities, maintenance, supply and administrative facilities, troop housing and utilities, Naval Air Station. $17,666,000.

▲ **Tex., Houston**—JET AIRPORT—City, City Hall, jet airport. $2,200,000. Hedrick & Stanley, 5201 Fannin, consult. engrs. CD 1/29.

U. S. POSSESSIONS

▲† **Guam**—HOUSING—Commander Naval Forces Marianas, 14th Naval Dist., Navy No. 128, Fleet Post Office, San Francisco, Calif., plans by Benedict, Beckler & Assoc., 3501 Cahuenga Blvd., Los Angeles, Calif., 220 unit Capehart Housing, Naval Base. $3,410,000. CD 7/23/48.

PUBLIC BUILDINGS

▲ **Ala., Florence**—SCHOOL—Lauderdale Co. Bd. Educ., Courthouse, 4 schools, school addns. $4,600,000.

▲† **Calif., Livermore**—PLANT, etc.—Atomic Energy Comn., c/o Dir., 518 17th St., Oakland, high explosive development plant, Proj. 59-c-10, $2,000,000, storage and handling bldg., Proj. 59-c-11, $250,000; lineal acceleration tester, Proj. 59-c-8, $390,000.

▲† **Calif., Lemoore**—HOUSING—Dist. P. Wks. Officer, 12th Naval Dist., San Bruno, plans by Richard J. Neutia, Robert E. Alexander, Donald Francis Haines, 341 Market St., San Francisco, 800 units Capehart Housing. $12,400,000. Bids Apr. 1959. CD 4/10, under Airports, etc.

▲ **Calif., Martinez**—HOSPITAL,etc.—Contra Costa Co. c/o County Clerk, Courthouse, bond election Nov. 4, 150 bed hospital addn., and admin. bldg. $1,500,000.

▲ **Calif., Riverside** — SCHOOL — Riverside City High School Dist., 3954 12 St., plans by Caughney & Ternstrom, 922 N. La Cienega, Los Angeles, Rubidoux High School, West Riverside. $1,500,000. CD 6/26/56.

▲ **Calif., Santa Maria**—BUILDINGS—Santa Maria Junior College Dist., $2,000,000 bond election Nov. 4, campus bldgs.

▲ **Conn., Burlington**—SCHOOL—Regional School Dist. No. 10, Consolidated School Bldg., Unionville, plans by Moore & Salisbury, 1007 Farmington Ave., West Hartford, Regional Junior-Senior High School, Lyons Rd., for Towns of Burlington and Harwinton. $1,000,000. Marchant & Minges, 1007 Farmington Ave., West Hartford, consult. engrs. CD 8/6.

▲ **Conn., Hartford**—HOUSING—City of Hartford, Housing Dpt., City Hall, 100 unit, frame, brick veneer housing, Plainfield St. $1,000,000. CD 9/13/49.

▲† **Conn., New London**—HOUSING—Dist. P. Wks. Officer, Third Naval Dist., 90 Church St., New York 7, N. Y., plans by Kane & Fairchild, 734 Asylum Ave., Hartford, 200 unit Capehart Housing, Submarine Base. $7,750,000. Bids Feb. 1, 1959. CD 9/6, under Unclassified.

▲ **Conn., Newton**—SCHOOL—Town, Town Hall, plans by J. Gerald Phelan, 211 State St., Bridgeport, high school addn., Queen St. $1,192,000. Fletcher-Thompson, Inc., 211 State St., Bridgeport, engr. CD 9/10.

▲ **Del., Stanton**—SCHOOL—Stanton School Dist., elementary school. $1,000,000.

▲† **Ill., Great Lakes**—Housing—Dist. P. Wks. Officer, Ninth Naval Dist. Bldg. 1A, plans by Yost & Taylor, 500 Greenbay Rd., Kenilworth, 425 unit Capehart Housing, Navy Training Center. $6,587,500. Bids about January 1959.

▲† **Ill., Lemont**—LABORATORY—Atomic Energy Comn., Germantown, Md., fuels technology centers addn., Proj. 59-d-9, $5,000,000; chemistry hot laboratory, Proj. 59-e-7, $4,400,000; Van de Graaff accelerator, Proj. 59-e-13, $2,500,000; research and engineering reactor, design and engineering, Proj. 59-e-12, $1,000,000; CP-5 reactor imprvs., Proj. 59-e-2, $500,000, Argonne National Laboratory. CD 4/23.

▲† **Iowa, Ames**—RESEARCH REACTOR—Atomic Energy Comn., Germantown, Md., research reactor, Ames Laboratory, Proj. 59-e-15, $3,800,000; metals process development plant, Proj. 59-d-16, $1,900,000.

▲† **Iowa, Fort Dodge**—POST OFFICE, etc.—General Services Admin., 19th and F Sts. N.W., Wash., D.C., plans by Griffith Co., P. O. Box 90, South Kenyon Rd., constr. post office and court house. $2,210,000. CD 2/19, under Commercial Buildings.

▲† **Me., Brunswick**—HOUSING—Dist. P. Wks. Office, First Naval Dist., 495 Summer St., Boston, Mass., plans by Wadsworth & Boston and Wright & Pierce, 27 Exchange St., Portland, Me., 277 units Capehart Housing, Naval Air Station. $4,293,500. CD 9/8.

▲ **Nev., Carson City**—COURT HOUSE, etc.—Washoe Co., Carson City, voted $2,000,000 bonds, court house and jail.

▲† **N. J., Jersey City**—SCHOOL—City, City Hall, plans by Val Paulsen, 921 Bergen Ave.. School No. 30, Seaview Ave., Dickinson High School and Lincoln High School renovations, $2,200,000. CD 10/23.

▲ **N. J., Riverside**—SCHOOL—Twps. Springfield, Mansfield, North Hanover and Chesterfield, plans by Howell, Lewis, Shay & Assocs., Packard Bldg., Phila., Pa., Regional Junior High School, $1,000,000, Keast & Hood, 1201 Chestnut St., Phila., Pa., consult. engrs. CD 7/31.

▲ **N. J., Sayreville**—SCHOOL—Bd. Educ. voted bonds Sept. 4, school, $1,752,000. CD 12/13.

▲† **N. M., Albuquerque**—TEST and ENVIRONMENTAL INSTALLATIONS—Atomic Energy Comn., German, town, Md., test and envirmental installations, Proj. 59-c7, $1,488,000.

▲† **N. Y., Brookhaven**—HIGH FLUX RESEARCH REACTOR—Atomic Energy Comn., 1901 Constitution Ave. N.W., Wash. 25, D. C., high flux research reactor, Brookhaven National Laboratory, design, engineering

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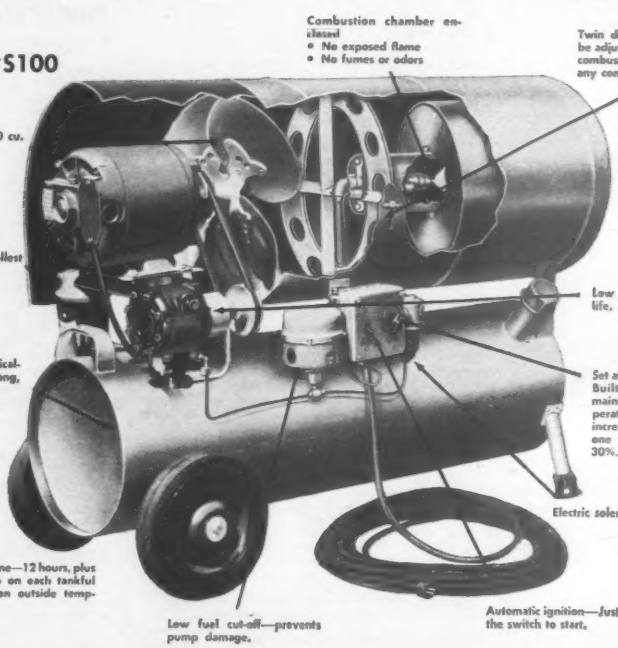
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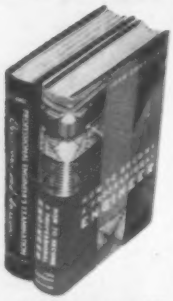

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and advance procurement, Proj. 59-e-11. $1,000,000. CD 10/26/55.

▲ **N. Y., Mount Vernon**—SCHOOL—Bd. Educ., 257 Fourth Ave., plans by Knappe & Johnson, 2 Overhill Rd., Scarsdale, N. Y., Edison High School adjacent to Davis High School. $6,000,000. CD 10/25.

▲ **N. Y., New Rochelle**—HOUSES—City, City Hall, Cedar Street Urban Renewal Project: two 150-family apartment houses. $11,500,000. Project approved by City Council Sept. 3.

▲ **N. C., Raleigh**—APARTMENTS—N. C. State College, C. H. Bostonian, chancellor, Raleigh, plans by Thomas Hayes, Southern Pines, 300 apartment units for married students, $2,200,000.

▲ **O., Avon Lake**—SCHOOL—Bd. Educ. plans by Mellenbrook, Foley & Scott, 20 Beech St., Berea, Junior High School, $1,600,000. CD 11/11.

▲† **O., Miamisburg**—PROCESSING PLANT—Atomic Energy Comn., Germantown, Md., special processing plant, Mound Laboratory, Proj. 59-b-4, $2,000,000

▲ **O., Toledo**—FEDERAL OFFICE—General Services Admin., 19 and F Sts. N.W., Wash., D. C., plans by Bellman, Gillett & Richards, 1600 Madison St., constr. federal office bldg. $5,183,000. CD 3/31. under Commercial Bldgs.

▲ **Pa., Bristol**—SCHOOL—Bristol Pa. Bd. Educ., plans by Sabatino & Fishman, 116 S. 19th St., Phila., Junior-Senior High School addn. $1,400,000. Keast & Hood, 1201 Chestnut St., Phila. consult. engrs. Bids early in November. CD 3/26.

▲† **Pa., Phila.**—FEDERAL COURTHOUSE—General Services Admin. F St. between 18th and 19th Sts. N. W., Wash., D. C., plans by the Ballenger Co. and Harry Sternfeld, 1625 Race St., archts.-consult. engrs., 4 floor addn. Federal Courthouse Bldg. $5,100,000 CD 6/23/55.

▲ **Wash., Olympia**—SCHOOL—School Dist. No. 1, $1,605,000 bond election Nov. 4, high school, $2,000,000, CD 6/23.

▲† **Wash., Whidbey Island**—HOUSING—Dist. P. Wks. Office, 13th Naval Dist., 1611 W. Wheeler St., Seattle, plans by Basetti & Morse, and R. W. Beck & Assocs., 1621 Boren Ave., Seattle, 550 units Capehart Housing, Naval Air Station, $8,525,000, Bids Feb. 1959. CD 9/16/57, under Airports.

▲ **Que., Montreal**—SCHOOL—Montreal Catholic School Comn., 3737 Sherbrooke St. E., plans by Yves Belanger, 4481 St. Catherine St. W., high school and teachers training schoo! Westhill Park, $1,000,000. Lalonde & Valois, 615 Belmont St., consult. engrs. CD 9/17/57.

COMMERCIAL BUILDINGS

▲ **Conn., East Hartford**—HOUSES—Manner Estates, Silver Lane 120 Houses, "Manner Estates" Silver Lane. $1,200,000.

▲ **Conn., Norwalk**—SHOPPING CENTER—Merritt Parkway Shopping Center, Inc., 1359 Broadway, New York, N. Y. plans by Lathrop Douglass, 518 Fifth Ave., New York, N. Y., 255,528 sq. ft. shopping center, incl. supermarket and other stores on 13 acre tract, Main Ave. 2 story, 92,000 sq. ft. department store; 2 story 49,640 sq. ft. variety store; two 1 story store bldgs; one 54,000 sq. ft. and other 30,000 sq. ft. $2,555,280. CD 8/7/57.

▲ **Conn., Niantic**—HOUSES—W. H. Charbonnier, 54 Windward Way, Millstone Point, Waterford, 130 houses, "Laurel Hill Acres" Flanders Rd. $1,300,000.

▲† **D. C. Wash.**—CULTURAL CENTER—Cultural Center Bd., c/o Smithsonian Institution 10th and Independence Ave. S.W., cultural center, incl. opera house and concert hall, Potomac Riverside tract, Inner Loop Freeway and approaches to Theo. Roosevelt Bridge, Virginia Ave. $10,000,000-$25,000,000. Raising funds.

▲ **Ga., Atlanta**—MERCHANDISE MART—Atlanta Merchandise Mart, 105 Pryor St. N. W., plans by Edwards & Portman, 500 Grand Theater Bldg., 20 story merchandise mart, Peachtree and Harris Sts. $15,000,000.

▲ **Ill., Chicago**—OFFICE—United Insurance Co. of America, 1313 S. Michigan, Zone 5, plans by Shaw, Metz & Dolio, 208 S. LaSalle St., 25 story, 82 x 140 ft. office bldg., State St. and Wacker Dr. $12,000,000-$15,000,000. Constr. in 6 months. CD 6/12/56.

▲ **Ill., Des Plaines**—SHOPPING CENTER—Owner, c/o A. Epstein & Sons, Inc., archt., 2011 W. Pershing Rd., 60,000 sq. ft. shopping center, 15 stores, with parking for 400 cars. $1,000,000. Bids mid-October.

▲ **Ill., Park Ridge**—MOTEL-COCKTAIL LOUNGE—Royal Hollywood Corp., 3454 W. Devon Ave., Lincolnwood, plans by Arthur Swanson, 41 E. Oak St., Chicago, 250 unit motel and cocktail lounge, 6810 N. Mannheim Rd. $1,000,000. Bids in October.

▲ **Ill., Skokie**—BOWLING ALLEY—Nelson Harris, c/o Paper Mate Co., Merchandise Mart, Chicago, Zone 54, plans by Morton Z. Levine, 4831 Oakton St., Old Orchard Bowling Alley, conference room, cocktail lounge, snack bar, recreation room, playroom for children, parking, Skokie Blvd., 1 block south of Old Orchard Shopping Center, $2,000,000.

▲ **Iowa, Ottumwa**—HOSPITAL—Sisters of Holy Humility of Mary, St. Joseph Hospital, plans by Brooks-Borg, 815 Hubbell Bldg., Des Moines, 4 story, brick, concrete, steel, etc., 46-bed wing hospital addn. $1,500,000. Frank L. Pulley, 720 Securities Bldg., Des Moines, consult. engr. CD 4/18/57.

▲ **Minn., Duluth**—BANK—Northern City National Bank, Michigan St. at Third Ave. West. 3 story, 150-ft. frontage, etc. bank expansion. $1,250,000. Melander, Fugelso & Assocs., 603 Alworth Bldg., engrs.

▲ **Minn., Little Falls**—HOSPITAL, etc.—St. Gabriel's Hospital, Little Falls, plans by Bettenburg, Townsend, Stolte & Comb, 1437 Marshall Ave., St. Paul, Minn., 34-bed hospital addn. $1,500,000; boiler plant and laundry (separate bldgs.) $250,000. Bids in Spring.

▲ **N. J., Pompton Plains**—HOSPITAL—Bd. Trustees Chilton Memorial Hospital, Newark-Pompton Turnpike, plans by Raymond B. Flatt, 1246 Broad St., Bloomfield, 65-bed hospital addn. $1,200,000. CD 9/27/56.

▲ **N. Y., New York**—APARTMENT—Senville Realty & Constr., Inc., 4 West 58th St., Zone 19, plans by Schuman & Lichtenstein, 369 Lexington Ave., Zone 17, 19 story apartment, First Ave. northwest corner of East 56th St. $1,500,000.

▲ **O., Cleveland**—TOWN HOUSE—Sidney N. Galvin, atty., National Bank Bldg., Cleveland, and Theodore N. Berenson, pres., Edwin J. Dreyfus Properties, Inc., 50 Federal St., Boston, Mass., plans by John Hans Graham & Assoc., 2000 K St. N.W., Wash., D. C., 24 story, glass, concrete apartment, to be called "Town House", incl. 4 floors of parking, E. 13 St., $6,500,000.

▲ **O., Columbus**—OFFICE—Buckeye Union Casualty Co., 515 E. Broad St., plans by Benham Richards & Armstrong, 1124 Goodale Blvd., home office bldg., 1100 block of E. Broad St. $2,500,000. Raymond C. Reese, 300 Sandusky St., Toledo, structural engr. Byers, Urban, Klug & Pittenger, 1740 E. 12 St., Cleveland, mechanical-electrical co. engrs.

▲ **O., Dayton**—MOTOR HOTEL—Lawson Jaffe, 3733 Wales Dr., 4 story, 150 unit motor hotel, rooftop swim pool and roof garden, 100 car parking and shops, glass, brick and aluminum constr., 1st and Ludlow Sts., $1,500,000.

▲ **O., Xenia**—HOMES—Loving Bros., Inc., 529 E. Town St., Columbus, 126 homes. $1,300,000.

▲ **Pa., Phila.**—DORMITORIES—University of Pennsylvania, 3025 Walnut St., plans by Eero Saarinen & Assocs., Bloomfield Hills, Mich., womens' dormitories E. of 34th St. $3,000,000. Ammann & Whitney, 111 8th Ave., New York, N. Y., consult. engrs. CD 3/19/57.

▲ **Tex., Houston**—APARTMENT—Allen Field Enterprises, Inc., 5206 Warm Springs, plans by Anthony Liciano & Assocs., archts.-consult. engrs., 600 McGowan St., 170 unit pier and beam foundation, masonry apartment, 3800 block N. Braeswood Blvd. $1,500,000.

▲ **Tex., Farmers Branch**—SHOPPING CENTER—Farmers Branch Shopping Center, W. L. Earnhart & Assocs., 4519 San Gabriel, 1 story, 350,000 sq. ft. masonry shopping center. $3,000,000. CD 4/4, under W. L. Earnhart, 4519 San Gabriel St., as owner.

▲ **Wash., Issaquah**—COLLEGE—Sisters of Charity of House of Providence, 11544 Phinney Ave., Seattle Zone 33, plans by J. W. Maloney, Central Bldg., Seattle Zone 4, eight 200,000 sq. ft. rein.-con. bldgs. for Providence Heights College, $4,000,000. Bids next month.

▲ **Wash., Tacoma**—HOSPITAL—Lakewood Hospital Developers Assn., c/o Dr. L. E. Skinner, 10011 Gravelly Lake Dr. S.W., 100-bed hospital. $1,900,000. Work expected to start before Jan. 1.

▲ **Wis., Superior**—HOSPITAL—Superior Memorial Hospital plans by H. A. Hausen, 1225 Tower Ave., hospital. $2,000,000.

INDUSTRIAL BUILDINGS

▲ **Calif., Oakland**—PRODUCE DISTRIBUTION CENTER—Realty Factors Inc., c/o Alan A. Lindsay (representative) Atty: Central Bldg., produce distr. center (vegetable and produce warehouses) $7,000,000.

▲ **Fla., Jacksonville**—PLANT—Glidden Co., Union Commerce Bldg., Cleveland 14, O., plant for production of laevomenthol, $2,000,000.

▲ **Mo., Kansas City** — ASSEMBLY PLANT — Chevrolet Div., General Motors, 3044 W. Grand Blvd., Detroit, Mich., plans by Albert Kahn Associated Architects & Engineers, Inc., 345 New Center Bldg., Detroit, Mich., 2 story, 125,000 sq. ft. assembly plant addn., Leeds. $2,000,000.

▲ **N. Y., New York**—FUEL OIL TANKS—Consolidated Edison Co. of New York, Inc., 4 Irving Place, Zone 3, fuel oil tanks in concrete wall enclosure at 214-28 Ave. C; 199-215 Ave. D; 701-45 E. 13 St.; 700-746 E. 14 St. $1,250,000.

Tenn., Nashville—FACTORY—Cincinnati Sheet & Metal Roofing Co., 111 N. 1 St., factory, $174,000. Arley Bowen, c/o owner, engr.

▲ **Tex., Hondo**—PLANT—Medina Electric Co-operative, Hondo, 66,000 kw steam generating electric power plant, near here. 11,480,000. CD 4/21/52., under Unclassified, Texas.

UNCLASSIFIED

▲ **Calif., Hayward**—PARKS—City, City Hall, bond election Oct. 9, 9 parks, $1,000,000.

▲† **D. C., Wash.**—MUSEUM LABORATORY, etc.—National Park Service, Dpt. Interior, museum laboratory and mechanical maintenance shops, buildings and utilities, National Capital Parks. $1,017,200 appropriated.

▲ **Ga., Hampton**—AUTO RACE TRACK—Atlanta International Raceway, 1022 Mortgage Guarantee Bldg., Atlanta, plans by I. E. Saporta, 890 W. Peachtree St. N. W., Atlanta, auto race track, grand stands and road paving. $1,200,000. Thomas W. Lowe, Jr., & Assocs., 3166 Maple Dr. N. E., Atlanta, consult. engrs.

▲ **New Jersey**—GAS PIPE LINE—Transcontinental Gas Pipe Line Corp., 744 Broad St., Newark, 36 in. gas pipe line from Delaware River thru Ewing, Hopewell, Lawrence and Princeton, and from Kearny thru Lyndhurst, Rutherford, Carlstadt and Ridgefield, $15,000,000.

(Proposal Advertisement see pp. 89 to 92)

Construction Scoreboard

ACTIVITY THIS WEEK

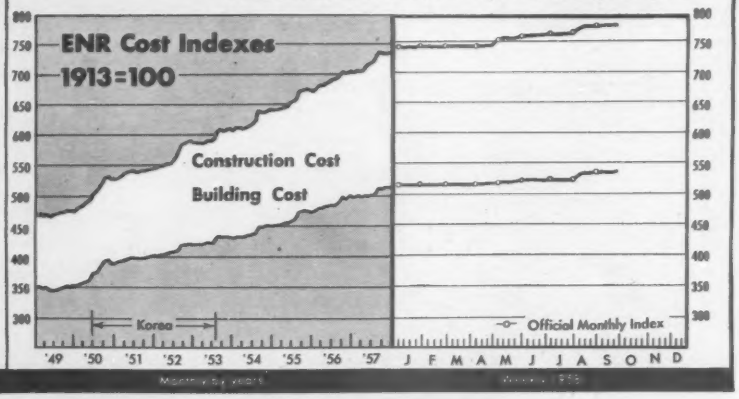
Contract Awards
Millions of Dollars

COST INDEXES AS OF NOW

ENR INDEXES (1913=100), 20-cities' average	Week of Sept. 25 1958	% Change from Aug. 28 1958	% Change from Sept. 26 1957
Construction Cost	775.39	+0.25	+5.16
Building Cost	536.62	+0.30	+3.81

Official Monthly Index for Sept. appeared here Aug. 28; Official Oct. Index will appear here next week.

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.515



AMOUNT OF CONTRACTS LET

By Ownership	This Week	Cum. 40 wks 1958 millions	Chge '57-'58 %
All Heavy Constr.	$495.6	$15,575.4	+8
Private	166.0	6,290.6	−6
Public	329.6	9,284.8	+20
State & Municipal	252.0	6,824.2	+17
Federal	77.6	2,460.6	+29
By Type of Work			
Public			
Waterworks	2.3	248.5	−7
Sewerage	12.9	479.7	+10
Bridges*	18.5	561.2	...
Highways	116.5	2,848.9	+18
Earthwork, Waterways	58.1	882.4	+3
Buildings, Excl. Housing	92.4	960.7	+83
Housing	4.9	2,134.1	+20
Unclassified	24.0	1,178.5	+33
Private			
Mass Housing	55.4	3,017.9	+28
Commercial	40.1	1,484.4	+8
Industrial	69.1	1,440.0	−44
Unclassified	1.4	339.1	−11

* Includes private bridges.

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, $344,000.

NEW CAPITAL FOR CONSTRUCTION

	Week of Sept. 25	Cum. 39 wks 1958 millions	Chge '57-'58 %
Corporate Securities	$77.6	$4,184.5	−4
State and Municipal:			
All Except Housing	150.3	4,871.3	+17
Housing	26.6	113.8	−27
Federal Loans	16.1	157.4	−8
Federal Aid	...	2,596.2	+20
Total Nonfederal	$270.5	$11,923.3	+8
Federal Appropriations:			
Projects in U. S.	...	$3,946.1	+42
Outside U. S.	22.4	35.2	+21
Total New Capital	$292.9	$15,904.5	+15

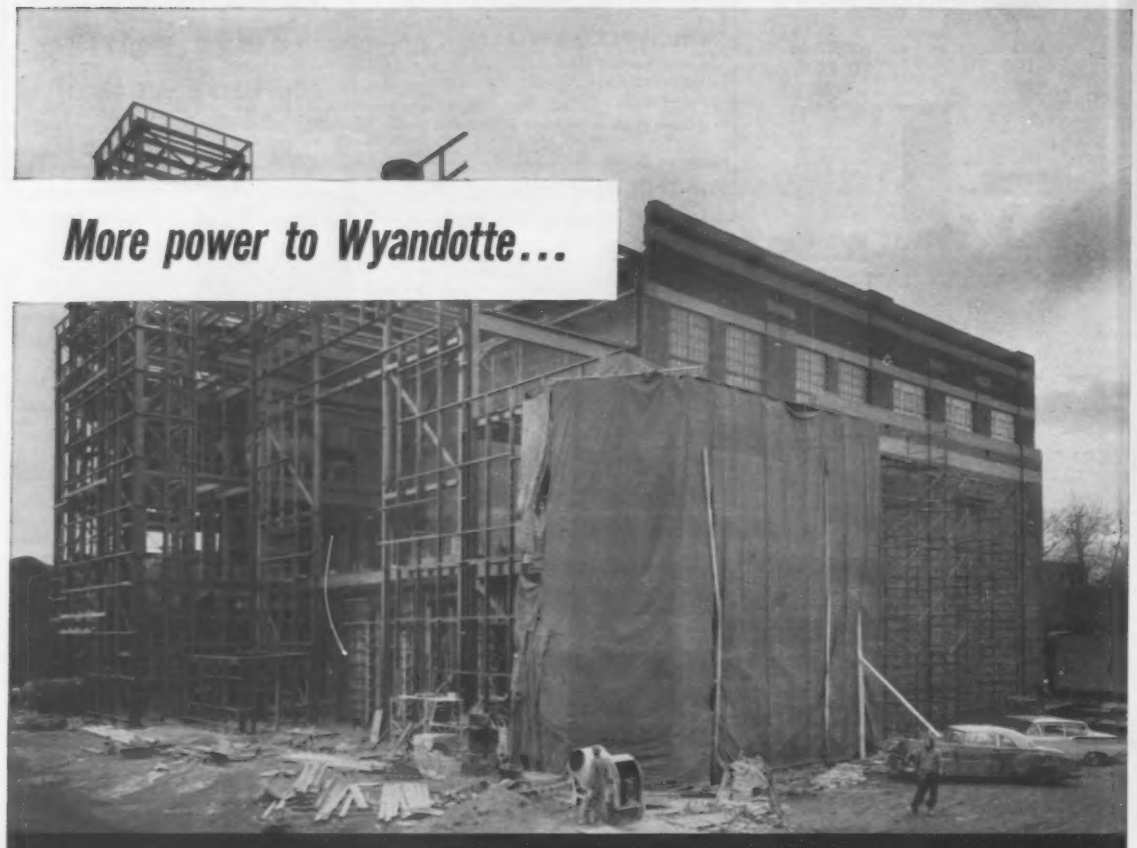
STATE AND MUNICIPAL BOND SALES

	1958 Sept. (millions)	1958 9-Mos. (millions)	Percent Change from 1957 Sept.	Percent Change from 1957 9-Mos.
All Construction	$576.9	$4,984.1	+ 28.0	+15.8
Buildings	309.3	2,116.7	+ 38.2	+ 0.8
Schools	151.4	1,436.8	− 16.1	−10.5
Housing	79.0	112.8	.....	−27.6
Other buildings	78.9	567.1	+ 82.1	+67.6
Heavy Construction	267.6	2,867.4	+ 18.0	+30.1
Waterworks	23.8	318.9	− 70.9	−16.7
Sewerage	28.7	341.9	− 1.3	− 2.4
Bridges	3.5	30.2	− 88.4	−52.4
Highways	55.7	849.5	+114.4	+39.4
Earthwork, dams, waterways	38.1	417.7	+7,827.6	+3,152.9
Unclassified	117.8	909.2	+ 98.6	+15.8
Electric and gas utilities	29.9	209.2	+ 69.0	+47.7
Airports	1.1	71.3	− 52.1	−38.4
Parking facilities	1.2	17.3	− 43.8	−40.8
Other	85.6	611.4	+131.0	+22.7

CONSTRUCTION MACHINERY PRICE INDEXES

Manufacturer Prices, 1947–49=100—BLS	Aug. 1958	Percent Change from last Month	Percent Change from last Year
All Types	165.6	0	+2.6
Cranes, Draglines, Shovels	163.8	0	+2.2
Shovel, ¾ cu yd	167.7	0	+2.9
Shovel, 1–1½ cu yd	178.4	0	+3.5
Shovel, 2–2½ cu yd	154.4	0	+5.0
Crane, truck mounted	164.2	0	+1.3
Scrapers and Graders	158.8	0	+1.5
Scraper, 4 Wheel, 12–15 cu yd	151.3	0	0
Grader, heavy duty	164.0	0	+1.5
Tractors (non-farm, incl. industrial)	180.5	0	+3.0
Wheel-type, off-highway (January 1955=100)	128.4	0	+5.2
Crawler type, 80–120 dhp	186.7	0	+2.4
Machinery, Tractor Mounted	161.7	0	+0.8
Dozer, hydraulic control	177.3	0	+1.3
Loader, shovel type	153.9	0	+1.4
Specialized Machinery	150.7	0	+4.1
Ditcher	154.1	0	+1.5
Roller, tandem	193.2	0	+6.3
Roller, 3 wheels	161.6	0	+4.4
Portable Air Compressors	159.1	0	+1.6
Contractor Air Tools	164.5	0	+0.1
Mixers, Pavers, Spreaders	150.1	0	+4.9
Mixer, truck, 6 cu yd	127.3	0	+4.3
Mixer, paving, 34 cu ft	185.2	0	+6.1
Bituminous paver	153.0	0	+2.1

The Charlson Co. of Wyandotte, Michigan, is building this addition to the Wyandotte Municipal Power Plant in accordance with plans and specifications prepared by Emery, Marker and Campbell, Engineers. Public Works Superintendent Carl Bufe says output will be doubled to 50,000 KW.



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*Sorry, not available in Louisiana and Texas

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Better Specifications Needed

Construction men take a critical look at "or equal" clause and tell how to make specifications clearer

The "or equal" clause in construction specifications is being shot at again. The clause permits the contractor to substitute an equivalent material or piece of equipment for the one specified. But engineers and architects say it encourages use of cheap materials, causes delays and attracts irresponsible contractors.

This is only one issue being raised about specifications, however. It was aired along with others at last month's joint meeting in New York City of two groups that are trying to put more sense into specs: The American Society of Civil Engineers (Metropolitan Section) and the New York Chapter of the Construction Specifications Institute.

Speakers represented four factions often in conflict over specifications: Arthur C. Holden (architects) of Holden, Egan, Wilson & Corser; John J. White (engineers) of Parsons, Brinckerhoff, Hall & Macdonald; E. G. Rau (contractors) of J. Rich Steers, Inc.; and R. K. Abrahams (owners), attorney with the Port of New York Authority. Harold R. Sleeper, architect, was moderator. All are of New York City.

The construction industry has brought specifications troubles on itself, in a sense, the panelists agreed. Long ago, specs were a page or so of description attached to drawings. Now, they often are 800 pages or more, matching the industry's growth in complexity and size. More important, they have become legal documents, and everyone stands to gain or lose by the way they are written and understood.

1. Discard "or Equal"

Misunderstanding is caused by the "or equal" substitution clause, said the architect, the engineer and the contractor. The clause often means unfinished drawings have to be issued to bidders so material or equipment can be chosen. Besides causing delay, Mr. White said, this means the architect or engineer can't select materials and equipment during the design stage, when he has time to choose carefully.

More important, the clause means, in practice, choice of a material equal to the least desirable material specified, as the contractor is always interested in cutting costs. The clause is sometimes "an invitation that draws the worst type of irresponsible plunger and speculator into the field of construction," Mr. Holden believes.

Why was the "or equal" clause adopted? Specifying a single material led to cases of collusion and graft, Mr. White explained. Sometimes local statutes required the clause. It was meant to introduce fairer practices.

How to throw out the bath but not the baby? Mr. White passed on the method he uses. First, preferred materials and equipment are picked during design. Then, the contractor—not the owner or engineer—is required to prove the adequacy of substitutes. And he must also tell how much cheaper the alternative would make his contract price. In this way, the owner gets the benefits of any savings, and the contractor often loses his enthusiasm for substitution. This method is called the "base bid" specification.

Two other alternatives were suggested by the panel:

- Name three acceptable brands.
- Write performance specifications.

2. Get the Details in

When information is left out of specifications the contractor has to boost his bid to cover a wrong guess. The aim in specifications should be clarity and completeness, Mr. Rau said. The "or equal" clause offends, then, because it leaves the choice of material uncertain.

Mr. Rau made the same complaint about "as directed by the engineer," a phrase frequently appearing in specifications and one that makes it "necessary for the contractor to use a crystal ball." In a contract he once handled, a substance was to be added to the concrete as directed by the engineer and at no cost to the owner. The admixture cost $75,000, and guess work could have been eliminated by making it a unit price or indicating that it could be handled as a cost-plus item, Mr. Rau asserted.

Borings, test-pile data and other subsurface information are sometimes left out of specifications. The time needed for a job is sometimes carelessly calculater or even deliberately understated so the contractor will have to work faster. But if the contractor makes his own study, Mr. Rau said, he will then boost his bid to cover the overtime indicated. Thus the owner gains nothing and perhaps loses the efficiency of a normally paced job.

Insurance specifications are sometimes impossible to meet—such as those asking for insurance against acts of God and other types of liability unobtainable domestically. Mr. Rau also warned against taking parts of standard specifications and using them for a particular job. In most cases they turn out to be not applicable and result in confusion.

Detailed specifications have their own hazards, Mr. Holden pointed out. In disputes with the architect, the contractor is likelier to take detailed specs to court, especially on public works. Besides, there should be leeway for the builder or engineer on the site in case conditions indicate a change in the construction plan.

3. Close Insurance Loopholes

Indemnity provisions in construction contracts might not give real protection to the owner, Mr. Abrahams said.

In most cases the owner has to depend on a hairline legal distinction between "active" and "passive" negligence. He is protected against third-party claims only if he is "passively" negligent or not negligent at all. But he finds it hard to stay put out of that "active" category.

For example, the owner or his representative sees that the contractor has stacked lumber near a public sidewalk. He takes no action. A passer by is hurt when the stack overturns. Common sense says he was "passively" negligent, but the court says it was "active."

Governor Heads Authority For Waterway Development

Gov. James E. Folsom of Alabama has been named chairman of the Alabama-Mississippi River Compact Authority, newly organized bi-state agency to promote development of a waterway connection between the Tennessee and Tombigbee Rivers.

The two states have put up $180,000 to give the organization a start. Projected at present is a 253 mile canal to cost $300 million. It would run from Demopolis, Ala., to the Pickwick Pool on the Tennessee River.

(B&F continued on page 84)

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Capital Bank Is Ready to Lend

Need money?

The government's new capital bank for small business has started off amid strong interest from prospective borrowers. The Small Business Administration is now authorizing field offices to lend funds for the operation to existing state and local development companies. They, in turn, make loans to qualified small firms. Most of the lending will be shifted to newly formed development companies after SBA begins to charter them early next year.

For the existing development companies it means an expansion of operations. Until now, they could borrow a total of $300,000 from SBA for relending. Now they can make as many loans as they like, with a $250,000 limit on each. The new companies will be able to lend up to 20% of their paid-in capital to a single customer. Both existing and new bodies must limit loans to 10 years, with a possible 10-year extension.

SBA already has received 6,000 letters of inquiry about the program. Half came from small business, half from firms interested in being chartered as development companies.

Congress set up a $250 million revolving fund for the bank. But SBA hopes most of the money will come from private sources and has provided tax incentives as bait. The new development firms can buy stock and other debentures of the small businesses, as well as make loans. Dividends from these securities will be tax free, an attractive feature for investors in high tax brackets.

SBA expects to find contractors among the new bank's regular customers. Anyone can qualify whose receipts during each of the past three years did not exceed $5 million.

Earthwork, Dam Jobs Hit High

Contract awards for earthwork, dams and waterways in the U. S. during the first eight months of this year are 1% ahead of last year with a record total of $776.7 million. The margin of gain, according to ENR records, is expected to hold for the full year.

Next year, however, may see some tapering off in volume of new work in this category because the major work on projects for the Power Authority of the State of New York will approach completion.

• **Some big ones**—However, a predicted volume of $800 million in 1959 would still make it the third best year on record (ENR Aug. 7, p. 21). Included in the total will be some large projects; the $200 million Wanapum Dam in Washington and a good share of the Bureau of Reclamation's $222 million appropriation for fiscal 1959. In addition, the Corps of Engineers plans to start the $138 million Keystone Dam on the Arkansas River.

ENR's backlog of proposed earthwork and dam projects was $12.4 billion at the end of 1957—an all-time high. By August 31 of this year, it was trimmed to $11.6 billion as the inflow of new jobs lagged and outflow of work into contracts rose.

• **Pace setter**—This year the top volume was recorded in the Middle Atlantic region because of the New York Power Authority. Total volume in the region now is $330.6 million, compared to $85.3 million in 1957. This is a jump of 287% over 1957.

The Far West, with awards of $142.6 million, is in second place this year. Last year it was first for the first eight months with a volume of $402.9 million. This region got its boost last year from the Glen Canyon Dam award.

Salary Ceiling Plagues Vermont Road Department

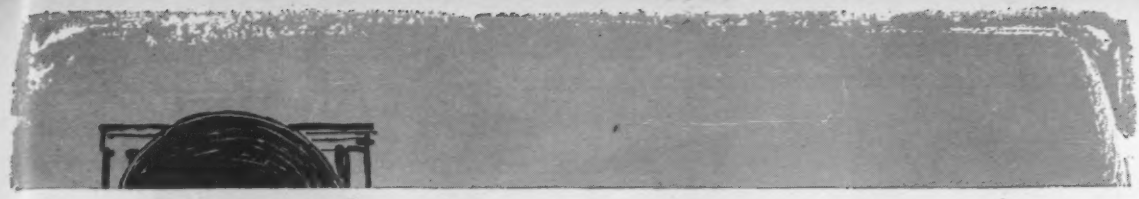
Gov. Joseph B. Johnson of Vermont has refused to grant scheduled pay raises to six veteran engineers in the Vermont State Highway Department on grounds that the pay boosts would put their pay above the $10,000 salary received by the state's highway commissioner.

The governor said he hopes the situation will be straightened out by the 1959 legislature.

The pay raises have been held up since mid-summer pending Governor Johnson's decision. All six engineers, heads of divisions in the highway department, receive $9,724 a year.

Highway Commissioner William Poeter's $10,000 salary is the highest of any department head in the state government, excluding the governor and the chief justice of the Supreme Court.

Mr. Poeter said he was disappointed by Governor Johnson's action, and hopes the 1959 legislature will approve the pay raises. He believes Vermont faces the loss of experienced engineers because of low salaries.



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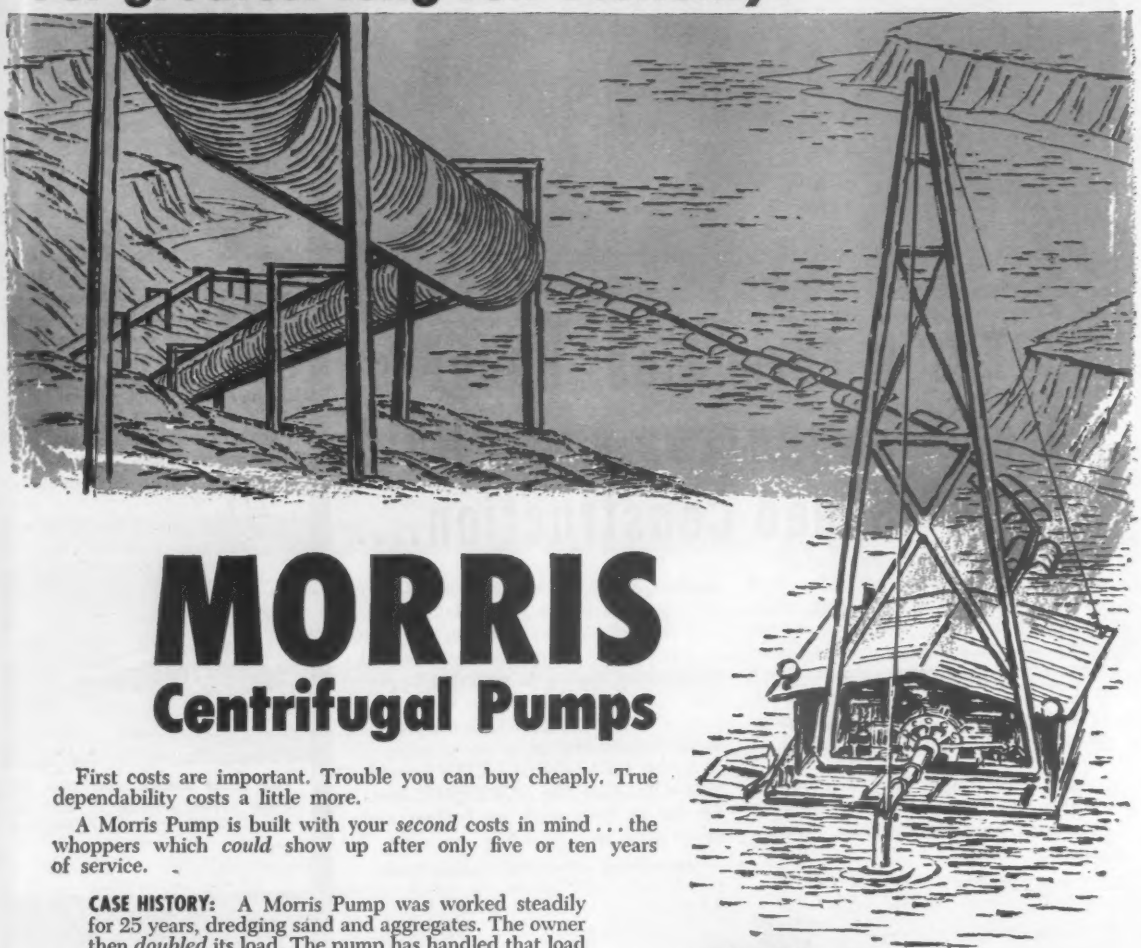

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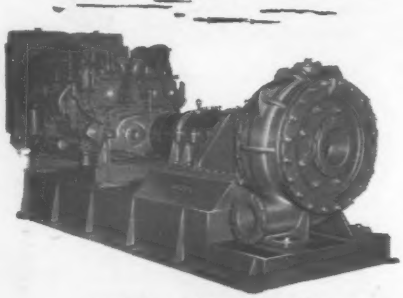

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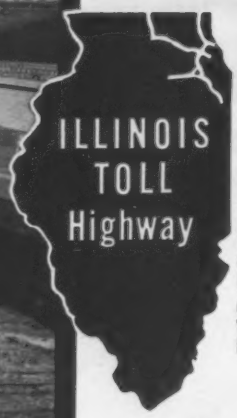

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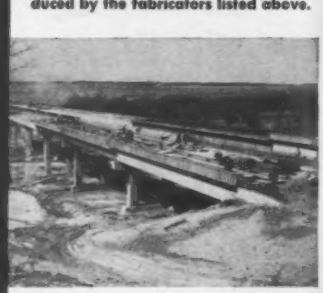

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A Hard Look at Labor Relations

AGC finds a lot of confusion and uncertainty and urges contractors to protect their interests

What kind of an immediate future do contractors face in the field of labor relations? And how can they cope with some of the more crucial problems?

Last week, the Associated General Contractors of America came up with some of the answers.

AGC finds labor problems in the construction industry as inevitable as death and taxes. It sees the industry in a labor atmosphere of "more than usual uncertainty and confusion" and, except in the area of jurisdictional disputes, thinks the situation may grow worse instead of better.

Subjects of particular concern, it says, include these:

- Union apathy at the local level toward removal of featherbedding practices.
- Industrial union attempts to take construction work away from contractors.
- A tendency on the part of federal agencies to extend the application of federal labor laws through the process of liberal interpretation.
- The possibility that the present cleanup of hiring practices will unnecessarily promote the use of hiring hall arrangements.
- Internal problems in the AFL-CIO that create a "confused state of leadership" within the building trades unions.
- Congressional failure to face up to the legislative needs of the industry.

These were some of the problems forcefully presented to association members at the AGC's midyear meeting in Atlanta (see p. 21). Frank J. Rooney, chairman of the association's labor committee, considered them important enough to suggest his committee's report as "required reading" for all members.

The basic problems, in the eyes of the AGC, shape up like this:

• **Featherbedding and productivity**—Here the results have been "disappointing." Efforts to achieve a full day's work for a full day's pay have been "very spotty and in no case wholehearted." Wage increases, meanwhile, have remained almost as high as they were last year—which marked a five-year high.

Local unions haven't taken the anti-featherbedding "ten commandments" very seriously despite the cooperation contractors have received from international unions. And contractors haven't pushed them to their full advantage.

The AGC urges international unions to instruct their locals to cooperate and is asking AGC members to insist on local adoption of the commandments. It recommends that all cases of union refusals to cooperate be reported to the international union concerned and to the Building Trades Department, which issued the codes.

• **Threat to contractors**—Closely related is the threat to the industry posed by the "growing power and aggression of industrial unions and their leaders." Chief complaint—and one that still disrupts the AFL-CIO—is the industrial union practice of getting their employers to agree by contract to do construction work with their own workers instead of hiring outside contractors.

Unless the building trades unions abandon wasteful and unproductive practices, the AGC says, they're merely inviting this trend to spread. Union leaders are aware of this danger but further efforts must be made to get the point across to local unions. AGC suggests closer cooperation with local Building Trades Councils.

• **Hiring practices**—An even tougher problem, perhaps, is changing hiring practices to meet the National Labor Relations Board mandates of the Mountain Pacific and Brown-Olds cases (ENR Sept. 18, p. 19).

Last Wednesday, NLRB General Counsel Jerome Fenton told AGC that no one knows the "scope and implications" of the decisions. And that's where the big trouble lies.

The AGC's advice to contractors in making the best of a bad situation is this. Consult a lawyer. Hang on to your "right and responsibility" to hire and fire. Oppose any move to promote the use of hiring hall agreements. And get a bond from the union to cover your liability for union misconduct to protect yourself if you make a hiring hall agreement.

• **Legislation by interpretation**—On a broader front, the AGC alerted contractors to the problems they face as a result of the way federal labor laws are being administered.

Under present rulings, for example, contractors must pay prevailing wages to owner-operators of trucks and vehicles (because they are employees and not independent contractors) and to employees of gravel pits that exclusively furnish materials to Davis-Bacon projects. Meanwhile, the Wage-Hour people are poking into highway projects to see if required overtime payments are based on correct Davis-Bacon classifications and rates. And there's now a move afoot under the Fair Labor Standards Act to make contractors add to regular rates for overtime purposes the value of board and lodging furnished in remote areas.

All this adds up to more burdensome laws than Congress perhaps intended. In some cases it means heavy contingent liabilities for contractors, in others it interferes with collective bargaining.

The AGC urges contractors to resist this kind of legislative extension and hopes Congress will investigate some of these areas next year. And here one of the targets is the secrecy with which the Labor Department surrounds its determination of prevailing wages (ENR Sept. 18, p. 188).

• **Legislation**—This trend seems to account, in part, for what looks like a new political awareness within the AGC. The association staff, for example, has prepared for the benefit of members a comprehensive report on legislative developments and trends, together with Congressional voting records on 12 key issues in each house. From all indications, the legislative year ahead will be hotter and more complex than this one.

The AGC points out that "something much more than the Kennedy-Ives bill is necessary" to correct the labor picture. It sees a need for further controls on restrictive practices of industrial unions and on secondary boycotts. (The McClellan committee, incidentally expects to begin hearings on the latter issue November 10). It opposes the pre-hire contract and objects to further extensions of the Davis-Bacon Act, at least without safeguards, either directly or indirectly as was attempted in the Depressed Areas and Fulbright Community Facilities bills.

It opposes extended coverage of the wage-hour laws and wants to see the Secretary of Labor's administration of

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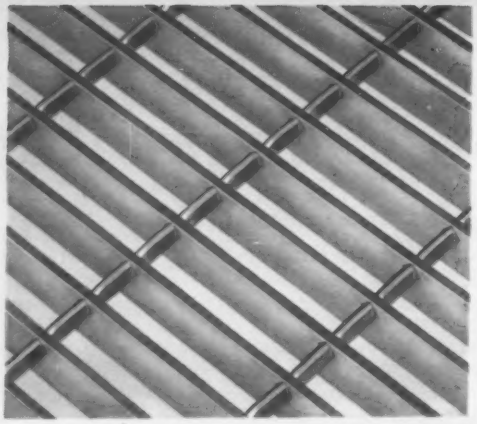

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the Davis-Bacon Act subject to court review. In short, it again reaffirms the legislative position taken at its 39th annual convention held in Dallas last February.

But lest its approach be interpreted as anti-union, the AGC says this: "An opportunity will exist, if it is deemed advisable, for a cooperative approach with labor to develop mutually acceptable proposals to correct the inequities faced by the construction industry under the Taft-Hartley Act, similar to the effort made by the Secretary of Labor during the past two years."

• **Jurisdictional disputes**—In all this confusion, however, the AGC finds a bright spot in the area of jurisdictional disputes.

It says the number of such disputes has dropped off considerably. The number of jurisdictional strikes is down 45% and this year may show the lowest number for any year since 1950. The duration of strikes is shorter, too. The National Joint Board is issuing fewer job decisions. And most cases today are either borderline or involve new materials and techniques.

What accounts for this? The AGC points to these developments. The board now commands greater respect. Its chairman and staff are working full time. McClellan committee disclosures are sobering the unions up a little. More international agreements have been signed. The NLRB has helped strengthen the voluntary method of settlement that the board represents.

The AGC, however, has two suggestions. Contractors should get more familiar with the way the board works. They should do a better job in making work assignments. And steps are being taken to give contractors some "say-so" in the drafting of international settlement agreements.

Organized Labor Begins To Present Solid Front

The AFL-CIO is well on the road to labor unity, at least in some respects.

The Rhode Island state AFL and CIO merged last month, marking the completion of 41 labor mergers at the state level.

In the meantime, 579 central labor bodies have been unified and consolidation at the local level has been completed in 29 states, plus Alaska, Panama, Hawaii and the District of Columbia.

States still not merged at the top level are Massachusetts, New York, New Jersey, Pennsylvania, Illinois, California and Idaho. Merger dates, however, have been set in four of these states.

Wage Talks in Equipment Field

Using the Ford Motor Co. labor contract settlement as a point of departure, the United Auto Workers union has handed five construction equipment and farm machinery manufacturers a new set of demands for contracts covering some 100,000 workers.

Negotiations resumed last week, after being recessed generally since the end of July while the union concentrated on the auto industry. In each case the old contracts were extended before they expired, but the extensions may be revoked and strikes called on short notice.

The first of the new demands went to International Harvester Co. They generally follow the three-year Ford pattern, which reportedly will cost 28 cents an hour. But in the case of supplemental unemployment benefits, the demands exceed those agreed to by Ford. Total demands would cost more than the Ford package.

Other companies now negotiating are Allis-Chalmers Manufacturing Co., Deere & Co., Caterpillar Tractor Co. and Oliver Corp.

Harvester has not officially shifted its July offer of a general wage increase of 2½%, or 6 cents an hour, whichever is greater.

Auto settlements have historically set the pattern for the equipment industry. But this year there is some talk of divorcing the negotiations in the two industries and of setting a common expiration date for all equipment contracts—probably a spring date. Within the equipment industry, Harvester is usually the pace setter, although in 1955 Allis-Chalmers settled first.

UAW has indicated without much conviction that it might strike if its demands are not met. Equipment companies have been doing comparatively well despite the recession.

Right-to-Work Measure Killed

A right-to-work ordinance adopted by California's San Benito County in 1957 has been declared unconstitutional by the state's District Court of Appeals in San Francisco.

The most significant thing about the decision is that the court endorses one of the principal arguments advanced by those who oppose right-to-work legislation. And that is that no government should require or prohibit union security agreements but should leave the matter to the processes of free collective bargaining.

Basis of the ruling is that the ordinance invades the state's legislative jurisdiction and violates the state labor law. The latter requires that the terms and conditions of employment be the result of voluntary agreement between labor and management.

The case was heard on an appeal taken from a lower court decision by Ted Chavez, a Gilroy, Calif., painting contractor.

The court noted that under present law it is the policy of the state "to equalize bargaining power as between labor and management by means of encouraging maintenance of effective unions." The ordinance violates this policy, the court declared, because the outlawing of union security agreements "adversely affects the power of the union to bargain effectively."

The court also observed that if cities and towns can regulate union shop provisions, then they can regulate and prohibit other terms and conditions of employment, "thus completely destroying the right of labor and management to determine these matters through voluntary agreement."

Right-to-work legislation, now effective in 18 states, has become a popular political issue. This November it will come before the voters in six states, including California.

Work, Wages and Prices Get New Twist in Spain

Two things of universal interest are now emerging in the new approach to labor relations under way in Spain.

Under a new law, workers and employers are permitted for the first time since General Franco came to power to negotiate wage agreements.

The law views bargaining as a two-way street. It is intended to promote through collective bargaining what many U. S. contractors have been pushing for—negotiated increases in worker productivity.

In implementing the law, the government has faced a problem on which the AFL-CIO has been focusing attention—it has forbidden employers to pass on to consumers the full amount of negotiated wage increases.

The first agreement under the law was concluded in San Sebastian last month. Among other things, it attempts to curb absenteeism by providing bonus pay for each day worked. The attendance bonus is higher for unskilled employees than for skilled workers.

OFFICIAL PROPOSALS

Bids: November 12, 1958

Lehigh-Northampton Airport Authority

NOTICE TO CONTRACTORS

The Lehigh-Northampton Airport Authority will receive sealed Proposals for the demolition and reconstruction of part of an existing runway and the site preparation work required for a new 5000 foot long runway. Proposals will be received by the undersigned until 1:30 P.M. (E.S.T.) November 12, 1958 at the office of the Lehigh County Commissioners, Court House Annex, 523 Hamilton Street, Allentown, Pa., and will be publicly opened after 1:45 P.M. (E.S.T.) of the same day.

Copies of the Plans, Specifications and Proposal Forms can be obtained at the office of G. Edwin Pidcock Co., Consulting Engineers, 546-548 Hamilton Street, Allentown, Pa., upon payment of Forty Dollars ($40.00) for each set. Any Bidder, upon returning such set in good condition within ten (10) days after the opening of the Proposals, will be refunded Twenty-Five Dollars ($25.00) of his payment.

The work under this contract shall be done in accordance with the "Standard Specifications for the Construction of Airports" (Civil Aeronautics Administration) as published by the United States Government Printing Office in January 1948, and revised and supplemented in August 1951 and June 1956. Copies of these Specifications can be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., at a price of $3.50 each.

Each Bidder must deposit with his Proposal, a certified check or surety company's bid bond in an amount of not less than five (5) percent of the Alternate Bid 1 as defined in the Instructions to Bidders.

Proposals must be submitted in duplicate on the prescribed forms provided, and in accordance with the Instructions to Bidders. No Bidder may withdraw his Proposal within thirty (30) days after the actual date of the opening thereof. The Lehigh-Northampton Airport Authority reserves the right to waive any informalities in, or to reject any or all Proposals.

The minimum wages paid all labor employed on this project shall be as tabulated in the Specifications and as approved by the Secretary of Labor of the United States.

ROBERT L. FOX
Secretary, Lehigh-Northampton
Airport Authority

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U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5113) wil be received at Superior, Nebraska, until October 30, 1958, for furnishing labor and materials for earthwork and structures, White Rock Canal, Station 0+00 to Station 314+20, and Laterals and Drains, Bostwick Division, Nebraska-Kansas, Missouri River Basin Project. Location near Republic, Kansas. Principal items are 321,000 cu. yds. excavation; 500 cu. yds. concrete in structures; 600 lin. ft. corrugated-metal pipe; 4,600 lin. ft. concrete pipe; and other work. Completion time 400 days. For particulars, address Bureau of Reclamation, P. O. Box 431, Superior, Nebraska; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

Sealed bids for construction of 12 story building at the United Nations Plaza, E. 45th Street, New York, N. Y., will be received until 2:00 P.M., E.S.T., October 31, 1958, c/o Business Service Center, Ground Fl., 250 Hudson Street, New York 13, N. Y., and then publicly opened. Bidding material may be obtained from the Business Service Center, Ground Floor, General Services Administration, 250 Hudson Street, New York 13, New York.

(Continued on the following page)

OFFICIAL PROPOSALS

Bids: October 14, 1958

Commonwealth of Pennsylvania Department of Mines and Mineral Industries Harrisburg, Pennsylvania

NOTICE TO BIDDERS

Sealed proposals will be received by the Department of Mines and Mineral Industries, Main Capitol Building, Harrisburg, Pennsylvania, until 11:00 A.M. Eastern Daylight Saving Time, Tuesday, October 14, 1958, at which time and place they will be opened publicly and read aloud, for the following:

Furnishing all labor, equipment and materials to install four (4) deepwell pumps, motors, power substation and control as purchased and furnished under Flood Control Project No. 13, Phase "A", and also to furnish and install structural steel, fence, discharge piping, fittings, grading material, pole line, concrete and other materials, and to remove certain structures and materials now installed.

Location of the Project—Buttonwood Shaft, Buttonwood Colliery, Glen Alden Corporation, Hanover Township, Luzerne County, Pennsylvania.

This project is one to the cost of which the United States Government may contribute under Public Law 162, 84th Congress (69 Stat. 352) and is subject to the terms of that Law, as well as to Act No. 82, July 7, 1955, Commonwealth of Pennsylvania, and to the "Procedures for Administration of the Act of July 15, 1955, to provide for the Conservation of Anthracite Coal Resources Through Measures for Flood Control and Anthracite Mine Drainage, (Public Law 162, 84th Congress, 69 Stat. 352)," and to the State-Federal Contribution Contract for Flood Control Project No. 13, Phase "B". The Commonwealth's acceptance of and liability arising out of any bid shall be subject to contribution by the United States Government under the provisions of said Contribution Contract.

Prospective bidders may obtain Specifications, Bid Proposal Form and Contract Form from Deputy Secretary, Department of Mines and Mineral Industries, Anthracite Institute Building, 237 Old River Road, Wilkes-Barre, Pennsylvania, upon request.

Joseph T. Kennedy
Secretary of Mines
and Mineral Industries

Bids: October 16, 1958

Power Authority of the State of New York

ADVERTISEMENT FOR PROPOSALS
FOR
CONSTRUCTION OF
NIAGARA PARKWAY SECTION I and RELATED FACILITIES
AT
PROSPECT PARK AND GOAT ISLAND
NIAGARA FALLS, NIAGARA COUNTY, NEW YORK
SPECIFICATIONS NO. 632.0
NIAGARA CONTRACT NO. N18

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the construction of Niagara Parkway Section I and Related Facilities at Prospect Park and Goat Island, located in Niagara Falls, Niagara County, New York, until 10:30 A.M. Eastern Daylight Saving Time on the 16th day of October, 1958 at the Authority's Office, 18th Floor, the Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place the proposals will be publicly opened and read aloud.

The principal items of work are:

Estimated:

130,000	Cubic Yards	Excavation, unclassified
4,300	Cubic Yards	Concrete for structures
5,700	Cubic Yards	Cement concrete pavement
500,000	Pounds	Bar reinforcement for structures
460,000	Pounds	Structural Steel
12,500	Tons	Asphaltic Concrete pavement

The work shall be completed on or before December 15, 1959.

Plans, Specifications and Proposal Forms for the work, may be obtained from the Power Authority of the State of New York, at the Coliseum Tower, 18th Floor, 10 Columbus Circle, New York 19, New York, upon application and prepayment of a fee of Ten ($10.00) dollars per initial set of contract documents, and Five ($5.00) dollars per set for additional sets, no part of which will be refunded. Plans, Specifications and Proposal Forms for the work will be on file in the Authority's New York Office and the Authority's field office, 2640 Main Street, Niagara Falls, New York, and in the offices of the Engineer, Clarke and Rapuano, 830 Third Avenue, New York 22, New York, and may be inspected by prospective bidders during office hours.

Bids must be made in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 20 percent of the gross sum price bid.

The right is reserved to reject any or all bids.

W. S. Chapin
General Manager

Bids: November 25, 1958

Mississippi River Bridge Helena, Arkansas

Sealed bids for construction of the following portions of the Mississippi River Bridge and approaches near Helena, Arkansas will be received simultaneously by the Arkansas and Mississippi State Highway Commissions at 10:00 A.M., November 25, 1958.

Contract No. 1, River Bridge Substructure, consisting of caisson piers for the river bridge.

Contract No. 2, Approaches to River Bridge—Substructure, consisting of piers and abutments for the approaches to the river bridge.

Contract No. 3-6, Relief Structures—Substructure and Superstructure, consisting of construction of piers and abutments and fabrication and erection of superstructure and deck, using either steel beams or precast prestressed concrete beams for two 1000-foot relief structures.

Contract No. 4, River Bridge Superstructure, consisting of fabrication and erection of superstructure metalwork and deck construction for the river bridge.

Contract No. 5, Approaches to River Bridge—Superstructure, consisting of fabrication and erection of superstructure metalwork and deck construction for the approaches to the river bridge.

Contract No. 7, Embankment and Paving, consisting of approximately 1.23 miles of embankment and paving.

Contract No. 8, Toll Collection Facilities, Utilities and Lighting, consisting of office building; garage building; toll booth; toll collection equipment; site grading and surfacing; bridge and area lighting; water, gas and power supply.

Plans and specifications may be obtained from Howard, Needles, Tammen & Bergendoff, 1805 Grand Avenue, Kansas City, Missouri. Bidders must be prequalified in both Arkansas and Mississippi.

Arkansas State Highway Commission
Glenn F. Wallace, Chairman
Mississippi State Highway Commission
T. C. Robbins, Director

Bids: October 14, 1958

Commonwealth of Pennsylvania Department of Mines and Mineral Industries Harrisburg, Pennsylvania

NOTICE TO BIDDERS

Sealed proposals will be received by the Department of Mines and Mineral Industries, Main Capitol Building, Harrisburg, Pennsylvania, until 11:00 A.M. Eastern Daylight Saving Time, Tuesday, October 14, 1958, at which time and place they will be opened publicly and read aloud, for the following:

Furnishing all labor, equipment and materials to install four (4) deepwell pumps, motors, power substation and control as purchased and furnished under Flood Control Project No. 13, Phase "A", and also to furnish and install structural steel, fence, discharge piping, fittings, grading material, pole line, concrete and other materials, and to remove certain structures and materials now installed.

Location of the Project—Buttonwood Shaft, Buttonwood Colliery, Glen Alden Corporation, Hanover Township, Luzerne County, Pennsylvania.

This project is one to the cost of which the United States Government may contribute under Public Law 162, 84th Congress (69 Stat. 352) and is subject to the terms of that Law, as well as to Act No. 82, July 7, 1955, Commonwealth of Pennsylvania, and to the "Procedures for Administration of the Act of July 15, 1955, to provide for the Conservation of Anthracite Coal Resources Through Measures for Flood Control and Anthracite Mine Drainage, (Public Law 162, 84th Congress, 69 Stat. 352)," and to the State-Federal Contribution Contract for Flood Control Project No. 13, Phase "B". The Commonwealth's acceptance of and liability arising out of any bid shall be subject to contribution by the United States Government under the provisions of said Contribution Contract.

Prospective bidders may obtain Specifications, Bid Proposal Form and Contract Form from Deputy Secretary, Department of Mines and Mineral Industries, Anthracite Institute Building, 237 Old River Road, Wilkes-Barre, Pennsylvania, upon request.

Joseph T. Kennedy
Secretary of Mines
and Mineral Industries

Bids: October 9, 1958

Contract B.P. 58-72

NOTICE TO CONTRACTORS

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Public Building Law and Highway Law, sealed proposals will be received, until 10:30 A.M., D.S.T., October 9, 1958, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y. for:

Contract B. P. 58-72 for
Beach Protection (Artificial
Beach Nourishment and Dune
Stabilization) at Westhampton
Beach, Suffolk County, New York

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts, 12th Floor
The Gov. Alfred E. Smith State Office Bldg., Albany, New York.
(b) Department of Public Works, 270 Broadway, New York City, New York.
(c) In addition to the above mentioned offices, plans, maps and specifications for Contract B.P. 58-72 may be examined and obtained at the office of Mr. Milton E. Goul, 325 West Main St., Babylon, L. I., New York

The deposit for Plans and Proposal Forms for Contract B.P. 58-72 is $10.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

The Engineer's Estimate of Cost for Contract B.P. 58-72 is $190,000.

Proposals for Contract B.P. 58-72 must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check, payable to the order of the State of New York, Commissioner of Taxation and Finance for the sum of $10,000.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Public Building Law and to the Highway Law as set forth in "Instructions to Bidders" in the contract specifications.

The right is reserved to reject any or all bids.

JOHN W. JOHNSON
SUPT. OF PUBLIC WORKS

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5106) will be received at Albuquerque, New Mexico until October 14, 1958, for furnishing labor and materials for earthwork, clearing, and structures for irrigation rehabilitation of Albuquerque Units 2 and 3, Middle Rio Grande Project, New Mexico. Location near Bernalillo, New Mexico. Principal items are lump sums clearing and cleaning about 11.8 miles of existing waterways; 6,000 cubic yards excavation for relocating waterways and from borrow; constructing 79 farm turnouts; 143 cubic yards concrete in structures; and other work. Completion time to April 1, 1959. For particulars, address Bureau of Reclamation, P. O. Box 252, Albuquerque, New Mexico; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

OFFICIAL PROPOSALS

Bids: October 9, 1958.

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.,—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A.M., eastern standard time, on the 9th day of October 1958, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following Projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimate Cost of Work
DISTRICT No. 1, G. L. NICKERSON, District Engineer, 353 Broadway, Albany, New York						
Essex (Rte. 28N)	FARC 58-141	Aiden Lair-Newcomb Pt. 1, S.H. 5187 Project No. S-210(4)	0.67	Asphalt Concrete	$6,000 Plans $5	$166,000
Saratoga (Rte. 67)	FARC 58-131 (Postponed from Sept. 18, 1958 Letting)	Ballston Spa-Scotch Church Pts. 1 & 2 S.H. 5334-5542, Project DS-382(2)	5.21	Asph. Conc. = 5.15 Mi. Misc. Work = 0.06 Mi. Reinf. Conc. Box Br. 20′	$50,000 Plans $5	862,000
Saratoga	FASS 58-14	Staffords Bridge-Gilberts Corners, C.R. 65 Project S-533(1)	2.40	Asph. Conc. = 2.36 Mi. Misc. Work = 0.04 Mi.	$11,000 Plans $5	205,000
Saratoga (Rte. 9)	FARC 58-143	Clifton Park-Crescent Pt. 1, S.H. 8065 Clifton Park-Round Lake, S.H. 1795, Project F-639(11)	2.24	Asph. Conc. = 2.13 Mi. Misc. Work = 0.11 Mi.	$35,000 Plans $5	648,000
DISTRICT No. 2, LACY KETCHUM, District Engineer, 109 No. Genesee Street, Utica 1, New York						
Fulton & Hamilton (Rte. 30)	FARC 58-139	Northville Village, North S.H. 5065, County Line-Hope Center, S.H. 5038 Hope Center-Wells, Pt. 1, S.H. 5133, Project F-1036(3)	5.23	Asphalt Concrete 2 Brs. Prestressed Conc. 204′ and 297.5′	$93,000 Full Size Only $25	1,688,000
DISTRICT No. 3, EARLE E. TOWLSON, Acting District Engineer, 333 E. Washington Street, Syracuse, New York						
Wayne	FASS 58-15	East Penfield-Walworth, Pt. 2, Co. Rd. 138 Project S-322(2)	5.31	Bit. Double Surf. Treated Stone	$35,000 Plans $5	677,000
DISTRICT No. 4, B. F. PERRY, District Engineer, Barge Canal Terminal, Rochester 1, New York						
Monroe	FATS 58-1	Rochester City: Inner Loop (South Ave. to George St.) Project DU-231(12)	0.53	Furnish and Install Traffic Signs	$1,000 Plans $5	18,000
Monroe	LOSP 58-3	Lake Ontario State Parkway Sects. A, B, C and D	....	Furnish and Erect 22,440 Feet of Aluminum Chain Link Fencing	$4,000 Plans $5	76,000
Monroe	FASS 58-13	Beahan Road (County Road) Project S-526(1)	1.68	Asphalt Concrete	$21,000 Plans $5	391,000
Monroe	FASS 58-16	Lake Road-East Fork (County Road), Project S-309(1)	0.26	Bit. Mac. Ty. 1 = 0.23 Mi. Misc. Work = 0.03 Mi. Prestressed Conc. Beam Br. 121.5′	$6,200 Plans $5	111,000
Ontario (Rtes. 14 & 96)	FATS 58-2	Geneva-Lyons, Pt. 2, S.H. 5252, Phelps-Junius Pt. 1, S.H. 5437, West Junius-Waterloo, Pt. 1, S.H. 8056, Project DF-1013(4)	3.63	Furnish and Install Traffic Signs	$1,100 Plans $5	20,000
DISTRICT No. 5, E. G. H. YOUNGMANN, District Engineer, State Office Bldg., 65 Court Street, Buffalo 2, New York						
Cattaraugus & Chautauqua (Rte. 322)	FARC 58-137 FASSH 58-13	Fredonia-South Dayton Pt. 3, S.H. 1381 Fredonia-South Dayton Pt. 4, Project S-510(1)	0.55	Asph. Conc. = 0.54 Mi. Misc. Work = 0.01 Mi. Comp. I-Beam Br. 146′	$16,000 Plans $5	285,000
Chautauqua	FIET 58-1	Interstate Route 504 (N. Y. State Thruway—Erie Sect.—Sub. E-1A) Shortman Road Ramps Project I-1072(5)	0.83	Asph. Conc. = 0.71 Mi. Misc. Work = 0.12 Mi.	$8,000 Plans $5	149,000
Erie (Rte. 20A)	RC 58-147	Orchard Park-East Aurora, S.H. 1066	0.88	Roadside Development	$160 Plans $5	3,000
Erie (Rte. 20A)	RC 58-148	Big Tree, S.H. 86 (Br. No. 2)	....	Clean. and Paint. One Bridge	$275 Plans $5	5,000
DISTRICT No. 6, JAMES H. THOMAS, District Engineer, State Office Bldg., 30 West Main Street, Hornell, New York						
Allegany, Chemung, Steuben, Schuyler, Tioga & Yates	RC 58-142	Fifteen Various State Highways on Rtes. Nos. 21, 244, 408, 13, 228, 227, 21, 53, 79 and 54A	54.00	Subsealing Cement Concrete Pavement	$15,000 Plans $5	277,000
DISTRICT No. 7, ROBERT W. SWEET, District Engineer, 444 Van Duzee Street, Watertown, New York						
Franklin (Rte. 95)	FARC 58-140	Hogansburg-Bombay, S.H. 820, Project S-499(1)	4.58	Asph. Conc. = 4.56 Mi. Misc. Work = 0.02 Mi.	$35,000 Plans $5	665,000
St. Lawrence (Rte. 37)	FATC 58-2	Village of Massena, Center St.-Parker St. Bridge and Interchange, FASSH 57-5 Project DUS-467(2)	0.64	Furnish and Install Traffic Signals	$2,000 Plans $5	38,000
DISTRICT No. 8, KURT G. RAUER, District Engineer, Pleasant Valley Road, Poughkeepsie, New York						
Dutchess (Rtes. 22 & 55)	FARC 58-138	Dover Plains-Pawling Town Line, Pt. 2, S.H. 5326 Project DS-542(1); DF-350(22)	2.69	Asphalt Concrete	$25,000 Plans $5	432,000
Ulster (Rte. 9W)	FARC 58-107	East Chester Street Extension, S.H. 9360, Project DF-357(3)	1.44	Asphalt Concrete	$14,000 Plans $5	250,000
DISTRICT No. 9, JOSEPH C. FREDERICK, District Engineer, 71 Frederick Street, Binghamton, New York						
Broome	FISH 58-12	Interstate Route 505, Penn. State Line, Rte. 17 at Five Mile Point, Cont. 2 (Blakeslee Rd. to Trim St.) Project I-1127(8)	2.57 (1.40 Acc.)	Grading & Drainage & Misc. Work = 3.21 Mi. Asph. Conc. = 0.27 Mi. Bit. Mac. Ty. 1 = 0.49 Mi. 2 Hy. Seps. Comp. I-Beams 136.8′ & 147.5′, 2 Brs. Twin Reinf. Conc. Boxes 30.3′ and 27.1′	$140,000 Plans $5	2,510,000
Otsego (Rte. 166)	FASS 58-11	Cherry Valley-Sprout Brook Co. Rd. 19, Project S-519(1)	2.54	Asphalt Concrete	$38,000 Plans $5	688,000
DISTRICT No. 10, M. E. GOUL, District Engineer, 325 W. Main Street, Babylon, L. I., New York						
Nassau	FALIE 58-1	Long Island Expressway (Guinea Woods Rd. to Post Rd. Cont. 1) Project U-862(14)	2.33 (5.30 Acc.)	9″ Col. Cem. Conc. Pavt. 2 @ 37′ Wide = 2.16 Mi. Misc. Work = 0.17 Mi. Serv. & Acc. Rds. = 5.03 Mi. Asph. Conc. & 0.27 Mi. Cem. Conc. 4 Hy. Seps. Reinf. Conc. Rig. Fr.: 1 @ 106.8′, 2 @ 106.2′, 1 @ 78′	$333,000 Plans $5	6,130,000
Nassau	FALIE 58-2	Long Island Expressway (Post Rd. to Jericho Tpke. Cont. 2) Project U-862(15)	2.20 (5.08 Acc.)	9′ Col. Cem. Conc. Pavt. 2 @ 37′ Wide = 2.11 Mi Misc. Work = 0.09 Mi. (Cem. Conc. Pavt. = 1.51 Mi. and Asph. Conc. = 3.57 Mi. Acc.) 2 Hy. Seps. Rig. Fr. 106′ and 106.3′ 2 Hy. Seps. Comp. Alum. Plate Girders 76.8′ Each	$333,000 Plans $5	6,055,000
Suffolk	SSP 58-3	Southern State Parkway Cont. 13	1.94 (1.82 Acc.)	9″ Col. Cem. Conc. Pavt. 2 @ 37′ Wide = 1.24 (+½ of 0.66) Mi. Asphalt Concrete = ½ of 0.66 Mi. Misc. Work = 0.04 Mi. (Acc. Roads and Ramps = 1.82 Mi.) Hy. Sep. 2 Rigid Frames 61′ Each With Service Stations R.R. Sep. 2 Steel Girders 67.9′ and 55.2′ Hy. Sep. Rigid Frame 69′ Plus Widen Exist. Struct. Hy. Sep. Rigid Frame 61′	$200,000 Plans $10	3,644,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage) Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal. Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Laws, as set forth in "Information for Bidders".

The right is reserved to reject any or all bids.

JOHN W. JOHNSON
SUPT OF PUBLIC WORKS

OFFICIAL PROPOSALS

Bids: October 9, 1958.

Contract B.P. 58-70

NOTICE TO CONTRACTORS

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Public Building Law and Highway Law, sealed proposals will be received, until 10:30 A.M., D.S.T., October 9, 1958, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y. for:

Contract B.P. 58-70 for
Beach Protection (Artificial Beach Nourishment) at Point O'Woods, Town of Brookhaven, Suffolk County, New York

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts, 12th Floor, The Gov. Alfred E. Smith State Office Bldg., Albany, New York.
(b) Department of Public Works, 270 Broadway, New York City, New York.
(c) In addition to the above mentioned offices, plans, maps and specifications for Contract B.P. 58-70 may be examined and obtained at the office of Mr. Milton H. Goul, 325 West Main St., Babylon, L. I., New York.

The deposit for Plans and Proposal Forms for Contract B.P. 58-70 is $10.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

The Engineer's Estimate of Cost for Contract B.P. 58-70 is $64,000.00.

Proposals for Contract B.P. 58-70 must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check, payable to the order of the State of New York, Commissioner of Taxation and Finance for the sum of $3,500.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Public Building Law and to the Highway Law as set forth in "Instructions to Bidders" in the contract specifications.

The right is reserved to reject any or all bids.

JOHN W. JOHNSON
SUPT. OF PUBLIC WORKS

Bids: October 28, 1958

Contract NYA-140.041

THE PORT OF NEW YORK AUTHORITY
NEW YORK INTERNATIONAL AIRPORT
VAN WYCK ENTRANCE ROAD
LANDSCAPING
PHASE I

Sealed proposals for landscaping portions of the Van Wyck Entrance Road from Conduit Avenue South to the Central Terminal Area at New York International Airport will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, October 28, 1958, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Assistant Chief Engineer for Design of the Authority, Room 1115 on and after Tuesday, October 7, 1958. Documents will be furnished upon deposit of $30.000 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.
THE PORT OF NEW YORK AUTHORITY

Donald V. Lowe, Chairman

New York, October 2, 1958

Bids: October 30, 1958

Power Authority of the State of New York

ADVERTISEMENT FOR PROPOSALS
FOR
THE CONSTRUCTION OF
SUPERSTRUCTURES
FOR
THE AMERICAN RAPIDS BRIDGE
AND APPROACHES AT
NIAGARA FALLS, NIAGARA COUNTY,
NEW YORK

SPECIFICATIONS NO. 5826 B
NIAGARA CONTRACT NO. N 15

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the construction of the Superstructures for the American Rapids Bridge and Approaches, Niagara Falls, New York until 10:30 a.m. Eastern Standard Time on the 30th day of October, 1958 at the Authority's Office, 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place the proposals will be publicly opened and read aloud.

The principal items of work are as follows:

Structural Carbon Steel	1,600,000 Lbs.
Structural Low Alloy Steel	2,750,000 Lbs.
Bridge Bearings	170,000 Lbs.
Aluminum Railings	4,000 L. F.
Class 1A Concrete	600 C. Y.
Class 2 Concrete	3,000 C. Y.
Lightweight concrete for Bridge Deck	400 C. Y.
Portland Cement (Type II)	6,000 Bbls.
Stone Masonry	400 C. Y.
Asphalt Plank Paving	1,200 S.Y.
Bar Reinforcement	240,000 Lbs.
Foundation Course & Cement Concrete Pavement	1,000 C.Y.

The work shall be completed on or before October 31, 1959.

Plans, Specifications and Proposal Forms for the work may be obtained from the Power Authority of the State of New York, at The Coliseum Tower, 18th Floor, 10 Columbus Circle, New York 19, New York, upon application and prepayment of a fee of Ten ($10.00) dollars per initial set of contract documents, and five ($5.00) dollars per set for additional sets, no part of which shall be refunded. Plans, Specifications and Proposal Forms for the work will be on file in the Authority's New York Office, and at the Authority's Field Office, 2640 Main Street, Niagara Falls, New York and in the offices of the Engineer, Praeger-Kavanagh, 126 East 38th Street, New York 16, New York and may be inspected by prospective bidders during office hours.

Bids must be made in accordance with the instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 20 per cent of the gross sum price bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

Bids: October 13, 1958

Oroville-Wyandotte Irrigation District South Fork Project

The Oroville-Wyandotte Irrigation District invites General Contractors who may be interested in later bidding, to examine preliminary plans for the South Fork Project and other available data, at the offices of the District's Engineers, Bechtel Corporation, 101 California Street, San Francisco, California, on October 13, 1958, preparatory to a contemplated guided tour of the project sites on October 15-18. It is anticipated that bids will be invited in the winter when a physical review of parts of the project at higher altitudes will not be practical.

Briefly, the project comprises construction of 8 new dams and minor reconstruction of another; approximately 18 miles of tunnels; 11,700 feet of penstocks; 3 hydroelectric power plants of an aggregate rated capacity of 88,000 KW; 17 miles of power and irrigation canals; and appurtenant minor structures, access roads, road relocations et cetera.

Arrangements for participating in the review and field trip may be made by contacting J. G. Thon, Chief Civil Engineer, at DOuglas 2-4032, Extension 2497, or by writing him at the above address.

Bids: October 15, 1958

Central Eletrica De Furnas S/A—BRASIL

Notice to Water Wheel Generator Manufacturers

Applications for prequalification of Bidders for the manufacture and delivery of synchronous generators designed for coupling to vertical Francis hydraulic turbines will be received at the main offices of Central Eletrica de Furnas S/A (FURNAS), Rua São José 90—2° andar, Rio de Janeiro, Brasil, not later than 12.00, noon, October 15th, 1958.

Manufacturers are cautioned to use first-class airmail for remittance of applications, and not parcel post as it involves considerable delay in delivery.

Tenders will cover the first stage (4 units totalling 640.000 KVA) of the Furnas hydro-electric development on the Rio Grande, near the town of Passos, State of Minas Gerais, Brasil. Operation of the first unit is required early in 1962, and of subsequent units at about three-month intervals. The Furnas Development will have an ultimate installed capacity of 1 100 000 kw in 8 units.

Applicants for prequalification must submit adequate information on at least the following items.

1. Manufacturing experience on large, slow speed water wheel generators.
2. Orders in hand and scheduled deliveries up to 1962.
3. Research, design and testing facilities for rotating machinery.
4. Research, design and analog or digital computers available for EHV transmission problems as related to alternating current generator design.
5. Available shop space and facilities, including size limitations of main machine tools.
6. Probable delivery schedule for the first and subsequent units starting from date of signature of contract.

FURNAS will only consider tenders submitted by the manufacturers selected among applicants at its sole discretion and judgment. Negotiations with FURNAS shall be held directly by the manufacturer's head offices or through branch offices or subsidiaries in Brasil. FURNAS will not deal with intermediaries or agents.

Invitations for tenders will be issued in November 1958, for submittal by the Bidder by February 1958. Placing of the order with the successful bidder is scheduled for about April 1959.

Bids: October 28, 1958

Contract NYA-120.003

THE PORT OF NEW YORK AUTHORITY
NEW YORK INTERNATIONAL AIRPORT
SIX FUEL TANKS

Sealed proposals for the furnishing and installation of six tanks for the expansion of the bulk fuel storage system at New York International Airport will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, October 28, 1958, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Assistant Chief Engineer for Design of the Authority, Room 1115. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.
THE PORT OF NEW YORK AUTHORITY

Donald V. Lowe, Chairman

New York, October 2, 1958

EMPLOYMENT NATIONAL COVERAGE OPPORTUNITIES

DISPLAYED RATE:

The advertising rate is $39.20 per inch for all advertising appearing on other than a contract basis. Frequency rates quoted on request.

An advertising inch is measured 7/8" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

OCTOBER 16th ISSUE CLOSES OCTOBER 6th

UNDISPLAYED RATE:

$2.40 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Position Wanted ads take ½ of above rate.

Box numbers—count as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

Send NEW Ads and Inquiries to Classified Advertising Division of ENGINEERING NEWS-RECORD, P. O. Box 12, N. Y. 36.

ADDRESS BOX NO. REPLIES TO: Box No. Classified Adv. Div. of this publication. Send to office nearest you.
NEW YORK 36: P. O. BOX 12
CHICAGO 11: 520 N. Michigan Ave.
SAN FRANCISCO 4: 68 Post St.

• POSITIONS VACANT

Highway Engineers—Highway Engineers with a minimum of 3 years experience. Excellent opportunity with established consulting engineering firm in Middle West. P-7909, Engineering News-Record.

Engineer-Management. Associate with legal and/or accounting training—development and construction of oil company terminal projects—New York and East Coast areas. P-8716, Engineering News-Record.

Superintendent Wanted for road construction. Rieth-Riley Construction Co., Inc., P.O. Box 477, Goshen, Indiana.

Bridge Designers with Interstate experience. Forward complete resume of education and experience with salary requirements to Macomber & Faber, 1824 N. 4th St., Harrisburg, Pa.

Civil Engineer with extensive experience in the design and construction of large capacity water supply projects including pumping stations and intake structures. Send complete resume including salary requirements. P-8804, Engineering News-Record.

Aggressive Civil Engineer—Age 24 to 30— General Construction estimator with some construction experience—Industrial, commercial, institutional—Opportunities and benefits—Location South East Ohio—Send resume. P-8834, Engineering News-Record.

Cost Estimator—With Heavy Construction Experience. Firm is established but growing. Upstate New York—Municipal Contractor. Desire young ambitious engineer. Salary and future dependent on ability. Furnish resume and references. P-8867, Engineering News-Record.

Water Treatment Engineer Must have had experience in the design of filtration plants, water softening, and iron removal. Registration desirous but not necessary. Consulting Engineering firm in the Midwest. State education, background and experience. P-8887, Engineering News-Record.

Estimator—General Contractor—Experienced —Commercial, industrial buildings—Allentown, Pennsylvania. Only estimator in office. State Experience and salary. P-8914, Engineering News-Record.

Wanted Architectural Draftsman with 2 or more years experience. Excellent opportunity with established consulting engineering firm in middle west. State education, background and experience. Reply to P-8590, Engineering News-Record.

Experienced estimator with background in concrete structures, grouting, foundations and concrete design. Outstanding opportunity with nationwide contractor for aggressive, alert engineer. P-8623, Engineering News-Record.

Wanted: Young graduate Engineer, preferably single, interested in overseas assignment with Consulting firm. State education, background and experience. Reply fully to P-8394, Engineering News-Record.

Wanted Registered Architect with 4 or more years experience. Excellent opportunity with established consulting engineering firm in middle west. State education, background and experience. Reply to P-8615, Engineering News-Record.

• POSITIONS VACANT

Wanted—experienced man for working plant superintendent. Manufacturing specification concrete pipe in modern plant located large, rapid growing southwestern city, write giving complete qualifications, salary expected and recent photograph. Reply held strictly confidential. P-8614, Engineering News-Record.

Construction Superintendent—Water Filtration. New England firm seeks man of mature judgment with heavy background in industrial or municipal filtration. Must supervise and assume complete responsibility for installing filtration equipment. Sound knowledge of piping, pumps, chemical feeders and related equipment necessary. Position involves travel U.S.A. Send complete resume of experience and salary requirements. P-8965, Engineering News-Record.

Young man with Civil Engineering training for position as Field Engineer on Sewage Disposal Plant Construction Project in Connecticut. Duties include field layout, quantity computation, and materials expediting. Salary commensurate with ability. Contact Mr. Raymond, The DeFonce Construction Company, Inc., 110 Colonial Avenue, Bridgeport, Connecticut. Telephone—EDison 5-5169.

An engineering firm of long and broad experience in the Mid West is seeking the services of a competent hydraulic and sanitary engineer with a bent toward successful public relations work. For a well-qualified individual the position could be highly remunerative. It involves continuous traveling throughout the Mississippi Valley and in some other areas of the United States also. Applications from qualified individuals are invited, with a listing of training and experience in considerable detail, and with a list of five qualified references. P-8974, Engineering News-Record.

Wanted: Engineer, Mechanical. Work in plant engineering with a firm operating four food plants in western New York State. Some experience preferred. P-8997, Engineering News-Record.

New Jersey State Department of Conservation and Economic Development has immediate vacancies for graduate civil engineers with two years experience in water supply, flood control, hydraulic or hydrographic engineering. Submit details and qualifications to Division of Water Policy and Supply, 520 East State St., Trenton 25, N. J.

Executive assistant to owner of medium size builder in Phila. suburban area. Must be capable of taking off costs; supervising and expediting construction of commercial, institutional and fine custom home building. Engineering background desirable. Ability to assist in directing and coordinating sales, planning, costs and construction will lead an aggressive and ambitious man to a top executive position with an opportunity to participate in the ownership of the business. Submit recent photograph. State age, education, experience, and salary requirement. P-8996, Engineering News-Record.

Structural Engineer—Midwestern prestressed and precast concrete producer needs experienced man to design products and help customers use them. Good experience for imaginative man interested in new ideas in structures. Reply giving resume of education, experience, etc. P-9005, Engineering News-Record.

Job Engineer medium sized growing general contractor in North Jersey area requires C.E. with 10 years experience in general heavy industrial and commercial construction layout, specifications, subcontract knowhow. P-9011, Engineering News-Record.

• POSITIONS VACANT

Estimator—Cost Engineer experienced on General Industrial and Commercial Structures. Must be a self starter. Good following of substantial sub-contractors helpful. Medium sized growing general contractor in North Jersey area. P-9010, Engineering News-Record.

• EMPLOYMENT SERVICES

Better Positions—$6,000 to $35,000. Want a substantial salary increase, more opportunity or different location? This national 47 year old service connects you with best openings. You pay us only nominal fee for negotiations: This we refund when employer pays placement fee. Present position protected. In complete confidence, write for particulars. R. W. Bixby, Inc., 559 Brisbane Bldg., Buffalo, N. Y.

Salaried Personnel $5,000-$30,000. This nationwide service successful since 1927 finds openings in your field. Sells your abilities; arranges contacts. Present position protected. Write for details—Jira Thayer Jennings, P. O. Box 674, Manchester, Vermont.

• POSITIONS WANTED

Const. Supt.; 20 years Institutional, Industrial, Commercial. Engineer. Anywhere. PW-8829, Engineering News-Record.

Civil Engineer, Registered, Member A.S.C.E., 25 years experience in Highway and Expressway Design, 10 years in responsible positions, interested in making permanent connection with consulting firm. Salary and location open. PW-8857, Engineering News-Record.

Construction accounting-public relations executive, fluent Spanish, presently engaged highway program Latin America country desires financial-accounting managership Latin America Heavy construction. PW-8879, Engineering News-Record.

Construction Controller—finance and control heavy construction projects. Thoroughly competent corporate accounting, reporting, costs, budgets, taxes, systems. Experienced all types contracts, corporate organizations, joint ventures. Knowledge French. PW-8925, Engineering News-Record.

BSCE-35-ten years varied experience in field of commercial, industrial and institutional work. Interested in working in engineering or construction office or teaching. PW-8892, Engineering News-Record.

Construction Supt. 32, BSCE. 11 years experience in building and heavy construction. Layout, Supervision, & Estimating. Desire similar position Midwest or South. Available Nov. 1, 1958. PW-8928, Engineering News-Record.

Graduate C.E., 29, 3 yrs. foreign construction. Desires opportunity for advancement to responsible position leading to professional recognition. Available after Nov. 1. PW-8934, Engineering News-Record.

(Continued on the following page)

Heavy Construction Manager

Seeks opportunity in Great Lakes area or Middle Atlantic States.

PW-8946, Engineering News-Record Class. Adv. Div. P.O. Box 12, N.Y. 36, N.Y.

ENGINEERS

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PREFER GRADUATE REGISTERED ENGINEERS WHO SEEK LONG RANGE EMPLOYMENT WITH AMPLE OPPORTUNITY FOR PROFESSIONAL DEVELOPMENT AND ADVANCEMENT IN A STEADILY EXPANDING AND GROWING ORGANIZATION.

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Work will be in the general offices in St. Louis. Interviews can be arranged in Washington, D. C., and San Francisco also.

Please write fully, including salary data, to

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Must have at least ten years responsible design and engineering experience in any of the following or allied fields:

STEEL PLANTS
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Send resume and photo to:
G. VICTOR HOPKINS

Arthur G. McKee & Co.
2300 Chester Ave. Cleveland 1, Ohio

COST ENGINEER

Internationally known contractor

Minimum 3-5 yrs. heavy construction experience—30-40 yrs. age. Civil Engineering degree. Train in New York Office until ready for foreign work. Good salary, future not limited.

P-8947, Engineering News-Record
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

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Career opportunities for individuals interested in professional recognition, ample opportunity for advancement based on merit, plus employee retirement plan, group life insurance, hospitalization, paid vacation and holidays.

Mail Resume To F. W. AHERN, Personnel Director

MICHAEL BAKER, JR., INC.
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Baker Building Phone SPruce 4-3010 Rochester, Penna.

OUTSIDE SUPERINTENDENT

Must be able to take outside metal erection work of windows, curtain wall, steel enclosures from estimating through completed job. Job sizes: up to $500,000. You should know how to

1. **Work with men;**
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3. **Coordinate outside erection with factory manufacturing.**

If you are interested in long hours, hard work, send your complete resume with your availability and salary requirements to:

P-8951, Engineering News-Record, Class. Adv. Div.,
P. O. Box 12, N. Y. 36, N. Y.

WANTED

ESTIMATOR and CHIEF ENGINEER

Experienced in estimating all phases of Highway Construction and Bridge Construction with Prominent Contractor in the Philadelphia area. Submit detail experience and educational record.

P-8845, Engineering News-Record
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

SHIPYARD
Industrial Engineer

Must be thoroughly experienced in fabrication, erection and material control—fearless trouble shooter.

Send job and educational resume to:

P-8943, Engineering News-Record
520 N. Michigan Ave., Chicago, Ill.

Salary open. All replies treated confidentially.

HIGHWAY ENGINEERS

Well known engineering and construction firm is interested in receiving applications from qualified graduate engineers for work in Central and South America. Must have had highway experience. Should be fluent in Spanish. Pertinent categories follow: Project managers, location engineers, design engineers, soils and materials engineers, construction engineers, maintenance engineers, bridge design engineers, administration and accounts manager.

Interested parties should mail application and resume of experience to:

CHIEF ENGINEER
P. O. Box 3 Houston 1, Texas

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Each of these positions offer a unique opportunity to participate in all phases of civil engineering in this long-established firm.
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Grand Cent Term, NY. 17 MU 6-5630

• *POSITIONS WANTED*
(Continued from preceding page)

Superintendent of heavy excavation earth and rock. PW-8930, Engineering News-Record.

General Manager—Medium size building construction firm. Seeks position leading to participation in ownership. Successful record. Graduate engineer. Middle thirties. PW-8704, Engineering News-Record.

Electrical Professional Engineer, 33, desires association with Consulting Engineer's or Architect's office. Presently in charge elect. design section of midwest consulting firm. Design of power, lighting, controls and communication systems. Previously managed and supervised design & constr. of A.F. Family housing projects. Other elect. military constr. experience. PW-8746, Engineering News-Record.

Registered Engineer: Sewer design, layout, & processing, 27 years experience various phases and supervision. Desire small Municipal. PW-8959, Engineering News-Record.

Estimator—Chief Engineer with experience in both field and office on all types of work, invites replies from progressive Heavy Construction Contractors. PW-8961, Engineering News-Record.

Supt. or General Foreman—age 43—over 18 years experience highway construction supervising earthmoving equipment, excavating, drainage. Know men, methods and cost. Available at once. A-1 references. PW-8958, Engineering News-Record.

Civil engineer, graduated, 6 years varied design and field experience, wants responsible position Southwest—South. PW-8957, Engineering News-Record.

Structural Engineer, 50, leaving for Australia October 26, 1958 will welcome opportunity to work as Engineer or technical representative. Have been self-employed as Consultant to Architects and Industry for the last 14 years. Detailed resume on request. PW-8970, Engineering News-Record.

(Continued on opposite page)

SEARCHLIGHT SECTION

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The advertising rate is $25.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vert. on one col., 3 columns—30 in. to a page.

EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

UNDISPLAYED RATES

$2.40 a line, min. 3 lines. To figure advance payment count 5 average words as a line.

BOX NUMBERS count as one additional line in undisplayed ads.

DISCOUNT OF 10% if full payment is made in advance for four consecutive insertions of undisplayed ads.

• POSITIONS WANTED
(Continued from opposite page)

Graduate Student (Structures with some Sanitary) age 28, 2 yrs. exp. in Sanitary field work. Available Feb. Prefer Midwest. PW-8962, Engineering News-Record.

Civil Engineer, BSCE, PE, 37. 12 years experience subdivision work including surveying, layout, computing, estimating, design of utilities. Desire administrative or supervisory position with consultant, builder or contractor. Central Conn. or south. Mass. PW-8973, Engineering News-Record.

Electrical Engineer: Thirty-Five years experience all phases of electrical and mechanical construction and operation. Married, no children, free to travel. Excellent health. Layout and design. Prefer field construction. PW-8976, Engineering News-Record.

Manager of engineering and/or sales. 36, energetic, 14 years design, sales, application heavy steel forms for dams, tunnels, conduits; paving machinery, batching and ready-mix plants, clamshell buckets. Desire such connection with manufacturer as to allow Dallas residence. PW-8978, Engineering News-Record.

Project Manager or Construction Superintendent 25 years experience, heavy construction on heavy industrial, steel mill or oil refinery installations. Best references of proven accomplishments, available on short notice. Willing to travel. PW-8981, Engineering News-Record.

Const Supt available now in West or Southwest Area. Structural concrete, Heavy Exc, Concrete pipe, road pavement, & commercial building of piling. PW-8985, Engineering News-Record.

Construction Engineer, 23, BSCE, married, exp. as field engineer heavy industrial construction, desire position with gen. contractor in same line of work. Locate Texas or S.E. PW-8987, Engineering News-Record.

Product Engineer, (BS CE), (MS ME), (M SAE), 27, married, 6 years designing, welding, metallurgy, planning automotive industry; automobile, agricultural and earthmoving machines experience—speaks Spanish, Portuguese—Wishes management position in South American Country—knows markets—best references. PW-8992, Engineering News-Record.

Electrical and General Construction and Design Engineer, Project Manager or Resident Engineer, just finished assignment in Far East. Also have worked in Central and South America and Caribbean, now desires work in foreign country. PW-9001, Engineering News-Record.

Design Engineer desires position in office of consulting engineer. Three years experience Project Engineer, Resident Engineer and Design Engineer on sanitary work, water works, highways etc. Excellent references. Prefer northern New Jersey. B. C.E. degree. Age 26. PW-8998, Engineering News-Record.

Concrete Inspector, Canadian, recent immigrant. Age 30, 10 years experience in hydroelectric and heavy industrial concrete inspection. Member A.C.I. & A.S.T.M. Excel. references. Experienced all phases of control and construction. PW-8994, Engineering News-Record.

MSCE, looking for foreign employment, 4 yrs design & supervision, reinf. & prestr. concrete, on both sides Atlantic, German, English, Spanish, Italian, French. PW-8991, Engineering News-Record.

Estimator-General Construction-experienced from blueprint to bid. Competent pilot—7 years construction experience plus 4 years related. Minimum salary $9500.00 plus relocation expenses. PW-9009, Engineering News-Record.

Civil Engineer, 33, German education 8 years experience institutional, commercial, industrial, prestressed concrete, folded plate, special structures. Prefer Calif., New England. PW-9008, Engineering News-Record.

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• BUSINESS OPPORTUNITY

Civil Engineer, BS, MS, PhD, 12 yr. structural experience plus $25,000 capital, willing to associate with other CE, ME, EE, or Architect, to start new consulting firm in NYC area or any US major city. Would also consider partnership in existing similar organization. BO-8935, Engineering News-Record.

• FOR SALE

For Sale—Large New Modern Concrete Pipe Plant. Complete with ready mix bins, RR, buildings, machinery, 30 acres. P. O. Box 393; New Smyrna Beach, Fla.

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We have large acreages of fine land. Principals of wide experience in planning, designing and who have had experience in this type of work to open developments into key areas in Florida. Principal must have some cash to invest with owners of land and also to have the experience to run projects. Very little capital is needed as terms will be very flexible. A great opportunity for the right man with the know how. We are not offering employment, but party must have capital or a Company who has developed areas and has proper organization and the equipment to lay out streets, dredge and build homes.

This is the most unusual opportunity that is being offered to a group or Company that is seeking to develop and build fine medium priced homes in Florida. Sites are FHA approved. A separate Corp will be formed with the right principal and land turned over to this new Corp to start immediately. Only qualified Organizations and principals will be considered. Write your standing and qualifications to:

KARLINA DEVELOPMENT CORP.
Att. Mr. Wm. C. Karal
649 Wellesley Street, Weston, Mass.

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MANITOWOC

SEVEN SECTIONS, FORMS BARGE 40'x70', CAN HANDLE MODEL 3900 MANITOWOC CRAWLER CRANE.

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Model 250-D 3 cu. yd. Front End Loader—Approximately 1½ years old, equipped w/General Motors, type 4-71—Diesel Engine—Excellent Condition Throughout. Price, f. o. b. Winston-Salem, N. C. $10,000.00.

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Phone: Park 3-5544

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STEEL BARGES and WILEY WHIRLEY FLOATING CRANES

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Crane Shown 50 Tons, 65 Ft. Radius With 24' Turntable, 125 Ft. Boom

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3—LeTourneau-Westinghouse Model B Fullpak Scrapers, fully modified with new Fuller 1520 Transmissions. Condition is excellent and priced for immediate disposal.

1—LeTourneau-Westinghouse "Twin C" Pusher, the perfect mate to a fleet of rubber tired scrapers reduced in price to sell.

1—LeTourneau-Westinghouse Standard B Tournapull with Fuller 1520 transmission modification. This machine is a dependable high production unit priced right.

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10—22 Ton Rear Dump Trucks. Models 8TD, 46TD and 63TD, immediately available. Cummins and GM Diesel Power. Ready to go to work. Unusual savings.

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MODEL 4500 MANITOWOC SPEEDCRANE FOR SALE

Serial #4566, complete with 140' Boom (45' bottom steel, 38' top aluminum, 37' center aluminum), Caterpillar D386 Diesel engine, air controls, full revolving fairlead, 25'9" crawlers, 60" crawler treads, 5 KW Koehler light plant complete with lights, one 20' aluminum boom insert, air windshield wiper; including bucket.

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SALE OR RENT

1—15 B Bucyrus-Erie Crane and Backhoe
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1—25 Ton Bay City Truck Crane
1—30 Ton Lorain Truck Crane
1—D17,000 Caterpillar Power Unit
1—25 Ton Ohio Diesel Locomotive Crane
1—30 Ton Browning Diesel Locomotive Crane

B. M. WEISS COMPANY
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NEW and USED *(as available)*

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Fully equipped modern shops — all makes and models repaired — all work guaranteed — prompt service — complete line field supplies.

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AX 3-4422

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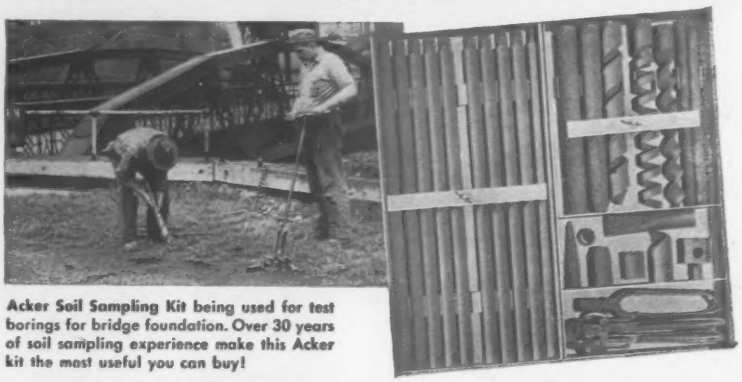

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OF ALL THE STRUCTURES that challenge the engineer's talents in the practice of his profession none exceeds the dam in its demands on technical competence, designing and construction skill and economic perspicacity. The recent meeting of the Sixth International Congress on Large Dams focused attention on the fact that technological improvements are being relentlessly pursued on a world-wide scale, and the group of articles in the September 11 issue of this magazine by dam specialists of five different countries offered undeniable proof that better, bigger, safer and more economical dams are being built as a result.

It is fortunate indeed that the challenge of dams is being met by a dynamic technology nurtured by a dedicated world-wide army of specialists. Were it to be otherwise, in fact, would be tragic, for dams are near the top of the list of structures necessary to the world's advancing standards of living. Regardless of a country's state of economic development, controlled streams and stored water are vital determinants of its future.

THE FOUR QUESTIONS DISCUSSED at the congress were ideally chosen to advance the technology of dams. Moreover, the character and content of the discussions left no doubt that the technology is rapidly discarding its cloak of art for the raiment of science. For example, the question of heightening concrete dams—raising existing ones or building new ones in stages—was discussed almost solely as a problem of stress transfer between the old and new concrete, taking into account their relative elastic properties, the effect of shrinkage and the shape of the joint for shear resistance. Science also offers a means to avoid many of these joint problems—anchoring the dam to its foundation by stressed vertical cables. Such cables so increase the structure's load capacity that it may be heightened directly or, what may be more important, permit thinner dam sections to be used originally.

The role of science was evident also in the question that emphasized the importance of measuring stresses and deformations in existing dams so that they can be related to computed values and to those obtained by the use of small scale models. Obviously the closer dam behavior can be controlled and anticipated, the better can economy, efficiency and safety be assured.

In this connection, too, the use of models as actual design tools, rather than as mere devices to check computations, is a development with a marked scientific aspect. By using simplified calculations to get an approximate design, which can be reproduced in a model, the design then becomes a matter of refining the model, as instrument measurements reveal its behavior. The result sought—and usually attained—is a dam section of minimum dimensions and proper shape to carry the stresses efficiently.

But more scientific design is only half the problem. Science also has a role to play in construction, and the other two questions discussed were largely focused on field operations—compaction of earthfills and production of better concrete through the use of admixtures. Here the sciences of soil mechanics and chemistry have given the dambuilders new and powerful tools with which to work.

THIS ATTENTION TO THE DETAILS of dam design and construction is paying off in better dams. This is amply apparent from the spectacular structures cited in the articles that appeared in these pages three weeks ago.

In France and Italy, the concrete arch has been carried to heights and degrees of slenderness hardly dreamed of when U. S. engineers were pointing the way to scientific arch design 50 years ago in the Pathfinder and Shoshone Dams. In Italy, too, the buttress dam, also pioneered in the U. S. by the Ambursen slab and buttress, has now become almost all buttress—and in the process a worthy competitor of the heavier gravity section structure. Switzerland, acting on the precedents set by America s Hoover Dam, has boldly undertaken a gravity dam half again as high as this once highest dam in the world. Sweden, on its part, has contributed substantially to more scientific dambuilding by showing how earthfills can be compacted, when necessary, under very wet conditions, and how concrete can be used in a very cold climate.

U. S. engineers, who have been responsible for nearly half of the 2,000 dams in the world over 100 ft high, can, of course, take justifiable pride in the part they have played in the transformation of dambuilding from an art into a science. Still the acknowledged leader in the field of earth and rockfill dams, the U. S. also laid the foundation for arch design by its early refinement of the arch-and-crown cantilever method and its development of the trial-load computation procedure. And in Hoover Dam, where cooling of mass concrete and its placement in joint-separated blocks were introduced, a guide was provided for all concrete dams constructed since.

THE IMPORTANT FACTS to be emphasized are that dam progress is being recorded in every part of the globe, that discoveries and achievements are being shared and that science is replacing the empiricism of art at a rapidly accelerating tempo. Dam technology, in short, is a dynamic technology, and the whole world stands to benefit. The challenge of the future is to retain this dynamic quality so the benefits may grow and multiply.